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THE RELATION OF THE APPENDIX TO PELVIC DISEASES.*

Based Upon a Clinical and Microscopic Study of 200 Cases.

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Combined operations may be said to be the order of the day. Not only is the gynecologist called upon to operate upon more than one portion of the generative tract at one sitting, but he is also expected to ascertain the condition of various other abdominal organs when the abdomen is opened for the treatment of pelvic disease. How much shall be done outside of the pelvic cavity during one operation will depend largely upon the number and kind of lesions present and the general condition of the patient. When there is a history of attacks of abdominal and pelvic pain and exploration through the suprapubic incision has shown the gall-bladder filled with stones, obviously cholecystotomy and removal of the stones are called for at the same operation, unless the general condition of the patient is a contraindication to the prolongation of the operation. In this manner will the patient be saved the discomfort and expense of a second operation.

The same line of reasoning may be applied to the appendix. Unless there be contraindications, everyone, I think, will agree that this organ, if diseased, should be removed whenever the abdomen is opened for other abdominal and pelvic disease. The question then turns upon the ability of the surgeon to determine by inspection and palpation if a given appendix be diseased. If the organ be enlarged, attached to diseased appendages or show other gross evidences of departure from normal, there arises no question as to the desirability of its removal. But is the appendix which is free from adhesions, which is not constricted or angulated to be considered a normal organ? Are the appendices which are free from adhesions but are constricted at one or more places diseased? In other words, can we, from macroscopic appearances alone, say whether an appendix is or is not diseased? Obviously, this can only be determined by carefully noting the gross appearances of

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the organ in a series of cases where the abdomen has been opened for other purposes, subjecting these appendices to careful microscopic examination and then combining microscopic with the clinical findings. If appendices presenting certain appearances be found in the majority of cases to be normal, while the contrary is proved to be the case in other appendices, the surgeon would soon have in his possession certain facts from which could be deduced rules which would govern his procedure at a given operation. Certain appendices he would remove because both macroscopically and microscopically he has found them to be diseased. On the other hand, if appendices to all appearances normal at the operation were shown microscopically to be diseased and vice versa, the operator would be obliged to dispense with rules, and in case of a certain proportion of the appendices being proved by the microscope to be abnormal, he would be forced either to close the abdomen with the knowledge that he was leaving behind a certain percentage of diseased appendices or he would be driven to remove every appendix irrespective of its physical appearance. Especially would he choose the latter course if his clinical experience had convinced him that often his patients suffered from a diseased appendix after the surgical cure of their pelvic lesions.

In 1893 my attention was called to the importance of a careful examination of the appendix when the abdomen was opened for pelvic disease. In that year I operated upon a single woman of 32, who for two years had suffered from dysmenorrhea and pelvic pain. The appendages were not enlarged but were extremely tender and, as there were no evidences of endometrial disease, they were supposed to be the cause of the pain. Section, however, showed the pelvic organs normal. The appendix was found unusually long and club-shaped. Its removal resulted in a cessation of the attacks of pain and a complete recovery.

Since this case I have made it a rule to examine the appendix whenever I was not completely satisfied that the patient's symptoms could be explained by the existing pelvic lesions. Like many another operator, however, I failed to record accurately my observations until some two years ago. Then, with the view of throwing some light upon the questions considered above, I began systematically to remove the appendix in every case where the abdomen was opened for other purposes, unless in my opinion the patient's chances of recovery were jeopardized by the additional five minutes' time required for the removal. Each appendix thus removed was subjected to careful microscopic examinations by Doctor R. L. Morse, pathologist of the gynecologic service of the Hospital of the University of Michigan. His work in turn was supervised by and his results verified in each case by Professor A. S. Warthin, director of the Pathological Laboratories of the University of Michigan.

In June, 1902, I presented before the Michigan State Medical Society a preliminary report of the microscopic findings in 34 removed appendices, together with certain clinical data relating to these same cases. At that time I purposely refrained from drawing any extensive conclusions, as I wished to study still further this important subject. Since that report I have removed and studied the appendix in 166 additional cases. I have deemed it wise to consider these cases together, since the second classification differs materially

from the one adopted in the preliminary report. I have included thirty of my private cases in this list, as the same care was used in the examination of these appendices as with the University Hospital cases.

Certain statements made in the first report apply equally well to this one, viz.: "The clinical material at the disposal of the department was as purely gynecologic as it could be made prior to the opening of the abdomen. Whenever it was suspected that the primary focus was situated in the appendix, the case was referred to the surgical clinic. Hence, to the gynecologist, the cases are of more value in showing the relationship between appendiceal and pelvic disease than if the doubtful cases had been included."

It has been the aim to conduct these investigations with a perfectly unbiased mind. No attempt has been made to prove any particular proposition by means of statistics. During the course of the study it became evident that a microscopic classification, admirable no doubt from a pathologic standpoint, was not at all serviceable in combination with clinical data. The classification finally adopted apparently meets all needs. With this microscopic classification clearly in mind, and with the clinical data in addition, it is hoped that the conclusions arrived at will be of real value to the surgeon.

According to the microscopic findings, the 200 appendices may be divided into:

1. *Negative.*—Comprising those cases showing no changes in the mucosa, submucosa, muscularis or subserosa, or upon the peritoneum, when compared with appendices taken as the normal standard and obtained from individuals without history of appendicitis and presenting none of the characteristics described below.

2. *Chronic Inflammation.*—Comprising those appendices presenting evidences of active catharrhal inflammation or ulceration of the mucosa, with atrophy of the mucosa and lymphadenoid tissue or muscularis associated with fibroblastic proliferation or formation of scar tissue.

3. *Doubtful Significance.*—Including appendices characterized by hyperplasia of the lymphadenoid tissue, dilatation or constriction of the lumen, hyperplasia of the connective tissue in the submucosa, local or general atrophy of the muscular coat, unattended by conclusive evidences of inflammation, the significance of these changes being unknown.

4. *Former Inflammation.*—Comprising those cases showing partial or complete obliteration of the lumen, formation of scar tissue in the mucosa and submucosa, lymphadenoid tissue and the muscularis without active signs of inflammation.

5. *Acute Inflammation.* — Including those cases showing active catarrhal or ulcerative inflammation without fibroblastic proliferation or formation of scar tissue, or atrophy of the different layers of the wall of the appendix.

6. *Peri-appendiceal Inflammation.*—Including those cases showing a purulent inflammation of the subserosa, mesoappendix or muscularis with the mucosa unchanged or secondarily involved.

Microscopically, the 200 cases can be arranged in the six groups as follows:

1.	Negative,	65 cases,	32.5%
2.	Chronic Inflammation,	57 "	28.5%
3.	Doubtful Significance,	41 "	20.5%
4.	Former Inflammation,	28 "	14.0%
5.	Acute Inflammation,	6 "	3.0%
6.	Peri-appendiceal Inflammation,	3 "	1.5%
	Total,	200 cases,	100.0%

It may be well to state in this connection that Dr. Warthin has ever had in

mind in his examination of each appendix the main object of the investigation, and, whenever there has been a doubt regarding the abnormality of the specimen, it has been placed in a class by itself. This is of importance for it does away with the criticism that a pathologist can always find something wrong with a specimen. Combining cases of "doubtful significance" (41), with the negative or normal cases (65), we have 106 cases, or 53 per cent. showing practically no evidence of disease, while 94, or 47 per cent. of the appendices removed during the course of the sections for other purposes were diseased. As would be expected, the kind and extent of the disease varied in the different specimens from acute inflammation to where the disease had ceased to be active and was recognizable only by scar tissue, the result of former inflammation.

These figures are definite and conclusive as regards the condition of the appendix, as shown by the microscope in 200 appendices removed incidentally in the course of as many operations for various pelvic lesions. The operator is not obliged to state his impressions of how often in sections of this kind the appendix will be found diseased. Such "impressions," although stated positively in medical society discussions, carry but little conviction with them, no matter how accurate may be the observer, for, as we shall show later, it is impossible for anyone to judge of the abnormalities of the appendix by its macroscopic appearances.

There are only three cases showing peri-appendiceal inflammation alone. There were, however, 12 additional cases, which were secondarily peri-appendiceal, although their chief characteristics placed them in other groups.

In the chronic inflammatory class there were eight cases or 14 per cent., which could be designated as ulcerative. In 29, or 50.87 per cent. there was an obliteration of the lumen of the appendix. This obliteration varied in position and degree. At times it was at the tip, at other times at some other portion of the tube.

In the peri-appendiceal class there were two cases of tuberculosis and one of primary carcinoma of the appendix. The latter rare condition will be considered later.

Clinically, the 200 cases have been tabulated under different headings, according to age, social state, dysmenorrhea, abdominal pain which might have been due to a diseased appendix and according to the disease for which the primary operation was performed. In addition, the observations made at the time of operation regarding the shape, length and condition of the appendix as regards adhesions have been carefully collected and tabulated in reference to the microscopic findings. It is not always possible, either in hospital or private practice, to secure histories of value for statistical purposes, but at least the attempt has been made in the 200 cases.

Social State.—This can have but slight bearing upon the relation of the appendix to pelvic disease, except as it shows the nature of the clinical material from which the statistics have been made. Of the 200 patients, 157 were married, 31 were single and 12 were widows.

Age of patients and length of appendix.—Ribbert has noted the length of the appendix in 400 post mortem cases during the decades of life from 10 to 60. He finds that the appendix reaches its maximum length between the tenth and thir-

tieth year. It gradually becomes smaller during the decades between 30 and 60.

Ribbert's Tables. Length in 400 Cases.		Author's Tables. Length in 107 Cases.	
10–20 years,	9.75 cm.		
20–30 "	9.5 cm.	20–30 years,	10.5 cm.
30–40 "	8.75 cm.	30–40 "	8.1 cm.
40–60 "	8.5 cm.	40–60 "	9.0 cm.

The length of the appendix was carefully determined in 107 cases at the time of the operation. The method adopted was to ascertain the exact length by means of an aseptic graduated aluminum rule after the mesentery had been tied and cut. It was found impossible to record the exact length by any other method when the appendix was curved or bent upon itself. Shrinkage of the appendix after its removal renders laboratory measurements far from accurate, especially if the stump method of removal has been employed.

The average length of the appendix in 107 cases was 8.5 centimeters. This agrees very nearly with the measurements of other observers. In Ribbert's 400 cases the average length was 8.25 centimeters. The longest appendix was 20 centimeters, the shortest 3.75 centimeters. Recently, however, I discovered in the routine examination of the appendix in a non-inflammatory case, an appendix measuring only 1 centimeter in length. There were no adhesions around this diminutive organ or any evidence that it had been amputated. Arranging the 107 patients into decades according to ages and comparing the average lengths of the appendices during these various decades, we see that the maximum length is reached up to the age of 30, 10.5 centimeters. This agrees with Ribbert's findings. There is a decrease in length in the next decade to be followed by an increase in the last two decades, contrary to Ribbert's statistics, where the average length decreases during each decade.

Arranging those with diseased appendices according to decades and comparing these with the corresponding decades of those whose appendices were normal, we see that the length of the appendix in the normal group decreases as the age of the patients increases, while in the inflammatory cases the change in the length corresponds to that recorded above, viz.: a maximum length between 20 and 30, a decrease in the next and an increase in the next two decades.

It is possible, nay, even probable, that inflammatory changes play an important role in determining the length of the appendix. It may be inflammation rather than atrophic changes due to old age which causes a decrease in length as the age increases.

Length of appendix in 107 cases, averaged according to groups and decades.

Normal Cases. (60) Length.		Inflammatory Cases. (47) Length.	
20–30 years,	10.3 cm.	20–30 years,	9.4 cm.
30–40 "	9.3 cm.	30–40 "	6.8 cm.
40–60 "	9.1 cm.	40–60 "	9.0 cm.

Dysmenorrhea.—MacLaren has called attention to the unsatisfactory results following the ordinary surgical treatment for supposed cases of obstructive dysmenorrhea and suggests that some of these cases may be explained by the presence of an inflamed appendix, which manifests itself by attacks of colic during the menstrual period. He cites a number of illustrative cases. Other gynecologists have advanced the same idea. Recently Guinard has called attention to attacks of pain in the female, which he designates as *appendicalgia.* Pain is the most prominent symptom and the actual change in the appendix may be very slight. In the opin-

ion of this writer also, in many cases of so-called dysmenorrhea, the fault may not lie in the uterus or appendages but in the appendix. My own experience and reasoning leads me to the same conclusion, so much so that I continually bear this cause in mind in the consideration of the etiology of dysmenorrhea, especially in young single women whose pelvic organs seem fairly normal. As having a possible bearing on this question, I have noted the presence or absence of pain at the menstrual period in all of the 200 cases. Of course the word dysmenorrhea is a relative one and must be defined nearly every time it is used. Where there was but slight pain, unaccompanied by clots, I have classed it as absent. It must be remembered also that in nearly all of the 200 cases the abdomen was opened for marked pelvic disease which in itself accounted for most of the painful periods. We find, however, that when the appendix is the seat of chronic inflammation, the proportion of cases having painful menstruation is greater than in those cases where the appendix was found normal. In the former group the percentage was 41.8, and in the latter 36.9.

This brief consideration of a diseased appendix as a causative factor in the production of dysmenorrhea is unsatisfactory. So many factors may be present, any one of which may be responsible for a large part of the dysmenorrhea in a given case, that the question must be, by its very nature, hard to solve. But that an appendix, the seat of chronic inflammation, can manifest itself at the menstrual period by a sharp attack of abdominal pain, I am thoroughly convinced.

History of Appendicitis.—It must be remembered that the cases under consideration were strictly gynecologic cases. The chief disease demanding operative treatment was supposed to originate, in every case, in the pelvis. The decision was arrived at after a careful consideration of the history and the pelvic findings. While in quite a proportion of the cases the involvement of the appendix was suspected, it was judged to be secondary to and of less importance than the pelvic lesions. We know now, what was not the case in the first consideration of appendicitis, that nearly as many women are attacked by the disease as men. Einhorn shows that of 18,000 autopsies performed at the Pathological Institute at Munich from 1854, in .55 per cent. there was perforative appendicitis in males, while the percentage in females was .57. Again, Krüger states that in Sonnenburg's clinic, in the seven years previous to 1897, out of 209 cases of appendicitis, 127, or 59 per cent., were men, while 41 per cent. were women. Or, take such a clinic as Ochsner's at the Augustana Hospital, of 90 patients suffering primarily from appendicitis, 39 were male and 51 were female. This may be from the peculiar nature of the clinic, but it is significant as showing the proportion of males attacked by this disease is not so greatly, if any, in excess of the females. The gynecologic service at the University Hospital is made up of material rich in new growths and chronic pelvic inflammatory lesions. Acute inflammatory cases do not predominate as is the case where the material is supplied from the poorer districts of a large metropolis. Hence, in one way, diagnosis is easier than when called upon to differentiate between appendicitis and pelvic exudates. To quote Ochsner again, besides the 90 cases treated in one year at his clinic, there were 13 cases in which the primary disease was in

the adnexa or both appendix and tubes were so extensively implicated that it was impossible to determine the primary seat of the inflammation.

An analysis of the 200 cases in reference to the history of possible appendiceal pain shows that such pain was present in 45 per cent. of the cases where the microscope showed the appendix was or had been diseased. Such pain was present in only 33 per cent. of patients whose appendices were subsequently shown to be normal. Of course, this is reasoning backwards and is of value only as showing that a more careful consideration of the location, periodicity and kind of pain in pelvic disease may give us a clue to coexisting involvement of the appendix. As before stated, patients giving a distinct history of appendicitis would have been referred to the surgical service. These figures simply mean that in 33 per cent. of the cases, the pain by its location and other characteristics was such as might have led to a suspicion of possible coexisting appendicitis, if it were possible to differentiate between pelvic pain and that originating from a subacute or chronic appendicitis.

Appendiceal Adhesions.—It is much easier to determine whether the appendix be free or buried in adhesions than it is to decide some of the questions just under consideration. Accurate observations were made as to adhesions in 146 of the 200 cases. The appendix was adherent 27 times, or in 18.5 per cent. Adhesions were twice as frequent in those cases where examination showed past or present disease as in those cases where the appendices were found normal. It is worthy of note, however, that in 6.1 per cent. of the normal cases adhesions were present.

Shape of the Appendix.—The shape of the appendix was noted as being abnormal in 52 out of the 200 cases, or 26 per cent. These abnormalities have been arranged in a table according to the divisions already referred to.

Table showing abnormalities of appendix in 52 cases:

	Class.	Total No. of Cases.	Club-shaped.	Constricted.	Bent on itself.
1.	Negative,	65	7 (10.7%)	6 (9.2%)	6 (9.2%)
2.	Chronic Infla.,	57	2 (3.43%)	7 (12.3%)	9 (15.8%)
3.	Doubtful Sig.,	41	6 (14.6%)	1 (2.3%)	3 (7.3%)
4.	Former Infla.,	28	1 (3.5%)	3 (10.7%)	4 (14.3%)

Cases of acute and peri-appendiceal inflammation were omitted because the small number interfered with the averages. A study of this table reveals a number of significant facts. In the first place, it clearly demonstrates that mere shape of the appendix cannot serve as an index of its normality or disease. Out of the 52 cases the appendix was noted as abnormal in shape 27 times where the microscopic findings showed no disease. The appendix was noted as being club-shaped in 13 cases, yet subsequent investigation showed no disease. In 25 cases, however, where the shape of the appendix was noted as abnormal, different degrees of inflammation were found on microscopic examination.

Such findings as these must at least throw some doubt upon the correctness of the assertions of those who claim to be able to tell whether the appendix be diseased by its mere shape.

Fecal Concretions.—Fecal concretions were noted 12 times out of 146 observations, or 8 per cent. This does not include fecal concretions as revealed by the microscope. Such concretions are of microscopic interest only and are of no value clinically. The 12 concretions referred to were pal-

pable and could be taken into account in deciding whether to leave or remove the appendix. No other foreign bodies were found in this series of cases. Ribbert found 10 per cent. of fecal concretions in his 400 cases. They were slightly more common in men than in women, 10.5 per cent. being noted in the former and 9 per cent. in the latter. Kelly reports Robert Abbe as being of the opinion that the perfectly normal appendix never contains fecal concretions. This statement is not borne out by the results of microscopic examination of the cases referred to. Out of the 12 cases showing fecal concretions, four showed inflammatory changes, while eight were normal. This shows conclusively that the presence or absence of fecal concretions cannot be taken as a criterion of a diseased appendix. The removal of an appendix containing one or more concretions on the ground that their presence is a source of danger and renders the appendix more liable to disease is, on the other hand, logical and seems to be supported by abundant clinical evidence.

Pelvic Pathology and the Condition of the Appendix.—The 200 cases which have been used as the basis for this investigation were not selected ones. They represent the ordinary cases which the gynecologist is called upon to treat, with the possible exception of being more purely gynecologic on account of the rules under which the patients are assigned to the various services.

While the various lesions for which the 200 laparotomies were performed have all been carefully tabulated, only illustrative groups in their relations to the gross and microscopical condition of the appendix will be considered.

Chronic Disease of the Appendages.—In this group have been placed all cases where the appendages were the subject of chronic inflammation. It includes degenerative changes in the tubes and ovaries, as well as active inflammatory processes. In some there were slight, in others dense adhesions binding down the appendages and uterus to the pelvic floor or coils of intestines. Other cases, however, were free from adhesions, the operations being performed for degenerative changes in the ovaries with or without retrodisplacement of the uterus.

Of the 106 cases of chronic disease of the appendages, 62 or 58.4 per cent. were accompanied by normal appendices, while 44 or 41.5 per cent., showed past or present changes in the organ. As regards the side affected it may be noted that the disease was confined to the right side of the pelvis in 8 cases, to the left side in 6 cases, while both sides were affected in 30 cases.

The frequency with which the appendix is diseased in inflammatory pelvic affections of the right side has been dwelt upon by numerous observers. MacLaren's experience is notable. He had 58 cases of inflammatory disease of the appendages out of 200 laparotomies. In 20 of these cases the appendix showed enough evidence of disease to require its removal. The appendix may be infected from its contiguity to the appendages, usually the right, at times the left. Infection may travel to the appendix from the appendages or vice versa by way of the appendiculo-ovarian ligament, a peritoneal fold joining the right ovary to the appendix, as was first pointed out by Clado and since verified by numerous observers.

Contiguity.—It is not uncommon to meet with the normal or abnormal appendix situated within the pelvis. It may or

may not be adherent to the appendages of the right or left side according to the inflammatory conditions present. While the appendix is more liable to come in contact with the appendages of the right side, it is perfectly possible, as I have demonstrated many times, in the presence of enteroptosis, or with a very movable cecum, for the appendix to rest upon the left tube or ovary. The appendix lies within the pelvis in a considerable proportion of cases. I have recorded it as within the pelvis in many of the cases where changes were found in the appendix. I am now noting its exact location, whether adherent or not, and it is surprising the number of times it lies within the pelvis. Poncet and Dormoy, in order to suggest a rational treatment of certain forms of appendicitis through the rectum or vagina, have adopted pelvic as a distinct classification. Kelly makes it a rule to remove long free appendices in all right sided pelvic operations. It would seem more logical to remove such appendices, no matter what part of the pelvis has been operated upon, since such free appendices can become adherent to any portion of the pelvis.

Interesting in this connection are the gross appearances of the appendix noted at the time of the operation. These have been arranged in the form of a table and are of value in the way of comparison. It will be noted that in the inflammatory group (44 cases) there were 18 cases or 40.9 per cent. of adhesions, while in the negative group there were only 11 adherent appendices or 17.7 per cent. In the same way the inflammatory group showed 14 cases, or 31.8 per cent. of constrictions, while there were only 11 per cent. of constrictions in the negative group. On the other hand there were more club-shaped appendices and fecal concretions in the negative than in the inflammatory group. This proves that even in chronic disease of the adnexa, where the appendix is more liable to be diseased, the mere gross appearance of the organ is no safe guide for its removal. Adhesions of the appendix to adjacent organs, even to the appendages, constrictions of its lumen, fecal concretions and a marked relative increase in the size of its distal end, does not necessarily denote that the appendix is diseased.

Table showing condition of appendix in 106 cases of chronic disease of the appendages.

	Total No.	Per cent.	Adhesions No.	Per cent.	Club-shaped No.	Per cent.	Constrictions No.	Per cent.	Fecal Concretions No.	Per cent.
Negative group,	62	58.4	11	17.7	5	8.1	7	11	6	9.6
Inflamma. group,	44	41.5	18	40.9	2	4.5	14	31.8	3	6.8

In one of my cases the appendix was removed unwittingly. A right-sided ectopic gestation sac was removed through a posterior vaginal incision. A careful examination of the specimen at the laboratory showed that the adherent and diseased appendix also had been removed. A moment's consideration will convince one that such an appendectomy must be of the crudest kind, and is an argument against the pelvic route for the treatment of pelvic lesions. Had the abdominal route been employed, not only could the ectopic sac have been more easily dealt with but the diseased appendix would have been discovered and removed in a surgical manner.

Uterine Fibromata.—There were in all 26 of these growths, arranged in two groups according to the presence or absence of adhesions. There were 19 in the non-adherent class, while in 7 cases there

were adhesions either of the appendages or some other portion of the growths. Nine of the patients with non-adherent tumors had normal appendices, while the remaining 10 showed inflammatory changes. Of the seven patients with adherent fibromata, four had normal appendices while in three inflammatory changes were present.

Of the entire number of patients with fibromata, 13 or 50 per cent., had normal appendices. Abnormalities in the gross appearance were noted in 4 cases, fecal concretions, adhesions, a constriction, and club-shaped being recorded in one case each. Of the 13 inflammatory appendices, two were adherent and three constricted. Hence, as far as the gross appearances were concerned, the appendices *appeared* diseased in only one less case in the negative than in the inflammatory group.

Ovarian Cystomata.—The two hundred cases included 24 ovarian cysts, varying in size from growths whose upper limits reached midway from the pubes to the umbilicus to very large tumors reaching to the ensiform. In 17 or 70.9 per cent. of these cases, the accompanying appendices showed inflammatory changes, while in 7 or 29.1 per cent. the appendices were normal. Thus the proportion of cases with diseased appendices is much larger than with fibroids. In nine of the 17 cases abnormalities of the appendix were noted at the time of the operation, one was club-shaped, two had fecal concretions, two were constricted, while three were adherent to the cyst wall. Of the seven negative appendices, one was bent upon itself and two were club-shaped. Thus, again it can be seen that the mere gross appearance of the appendix is no criterion of the microscopic picture.

Various observers have called attention to the frequency with which the appendix may be attached to the wall of an ovarian cyst. Sutton mentions this frequency and claims that the adhesions often arise from inflammation of the appendix. He quotes Doran as having had six such cases. Such an adherent appendix may easily set up an inflammation of the cyst wall, and the infection even extend to the cyst contents, giving rise to a suppurating ovarian cyst. Chognon, writing of the adhesions of the appendix to adjacent organs, collected from the literature 20 cases where it was adherent to ovarian cysts. My own statistics (three out of 24 cases) would show it even more common. Its position in relation to the cyst wall is important. Not only can appendicitis result but the cyst itself can be infected from the inflamed appendix.

Technique of Appendectomy as a Concomitant to Other Pelvic Operations.—Except in the case of the appendix accidentally removed through a vaginal incision for ectopic gestation, the appendices were all removed through the median abdominal incision. This is always made long enough to admit the operator's hand. So important do I consider the thorough exploration of the abdominal cavity, when once the peritoneum is incised, that I have dispensed with the small median incision. If the pelvic disease be severe enough to necessitate a laparotomy, a thorough exploration of the abdominal cavity is also called for unless there be contraindications. Pus in the pelvis would contraindicate the passing of the hand upward to the diaphragm for fear of septic contamination. It would not, however, prevent an examination of the appendix. On the other hand the general condition of the patient may be such as to preclude any

treatment except that directed towards the pelvic lesion. The appendix, with rare exceptions due to an extremely short meso-cecum or to adhesions, can be drawn to the median line with ease. The white band of the cecum serves as the best guide for the location of the latter. The hand is swept under the abdominal wall into the iliocecal fossa until the forefinger locates the band. The latter is then drawn into the incision and traced until the appendix is located. The appendix and cecum are then surrounded with gauze sponges to protect against possible fecal contamination and the appendix removed, the stump being touched with pure carbolic acid and buried by a purse string peritoneal suture.

The mortality attending the removal of appendices, the seat of chronic, not acute inflammation, should be nil. As far as could be ascertained in no one of the 200 cases was the mortality or even morbidity increased by the appendectomy.

Two years ago Howard Kelly secured through correspondence with 74 prominent surgeons in this country their opinions as to the advisability of removing the apparently normal appendix when the abdomen was opened for other purposes. Their replies showed that a large majority were against the removal of the normal appendix, simply because the opportunity arises to do so. An overwhelming majority, however, were in favor of the removal of the appendix when it deviates in the slightest degree from normal. This last opinion was brought out by the question whether the slightest adherent appendix when the abdomen is opened for other purposes should be removed. If the study detailed above has proved any one thing conclusively it is that adhesions of the appendix *do not* necessarily mean departure from the normal, viz.: a diseased appendix as revealed by microscopic examination. While adhesions were twice as frequent in those cases where the appendices showed past or present inflammation in 6.1 per cent. of the normal appendices adhesions were recorded as being present. The same may be said of club-shaped and constricted appendices and those containing fecal concretions. In other words the surgeon cannot tell in the class of work under discussion by gross appearance alone whether the appendix be or be not diseased. The surgeons quoted above would and do remove those appendices which they consider abnormal. They confess that the patient is much better off without the appendix if there be the slightest question of its being diseased. The reason they do not remove every appendix when the abdomen is opened for other purposes is because they feel that by inspection and palpation they can identify such a diseased appendix. I was of the same opinion before I began the above series of investigations. Now I am willing to confess to my inability to so determine.

I am convinced that in the past many of the failures to cure my patients after subjecting them to various surgical procedures via the suprapubic incision has been through neglect in not examining and removing the appendix. Appendiceal disease need not find expression in every case in an acute attack. The chronic form of appendicitis, with its rather frequent exacerbations, gives rise to pain, tenderness, or at least to an uncomfortable feeling in the right lower abdomen. I believe in many cases after complete ablation of the uterus and appendages for purulent disease, the subsequent abdominal pain and tenderness are not so commonly dependent upon adhesions as has

been supposed. Rather in many cases it is due to the presence of a diseased appendix. I know that my symptomatic cures have increased since I began systematically to remove the appendix when the abdomen was opened for other purposes. This alone is enough to warrant my continuation of the practice.

As I stated at the outset of this paper there may be contraindications to the removal of the appendix. However firmly the surgeon may believe it his duty to remove every appendix, he would not prolong the operation for five minutes if thereby he would seriously jeopardize his patients' chances of recovery. Neither would he remove the uterus in a case of bilateral pus tubes nor resect an ovary after removal of one pus tube, nor correct a retrodisplaced uterus in addition to other pelvic procedures, if thereby he thought he was diminishing his patients' chances of life. Yet rarely in his routine work does he have to decide against such additional procedures. I cannot see the force of the time argument against the removal of the appendix as applied to the large majority of cases. In my opinion, as before stated, the removal of the appendix as a concomitant operation when opening the abdomen for other purposes should not and does not in the hands of the trained surgeon add to the mortality of the abdominal section. Nor do I believe it prolongs the convalescence. These last two statements are individual opinions and possibly are of value merely as applied to my own work. But if they be universally true the only reason for the non-removal of every appendix where no contraindications exist is eliminated and the operator is logically compelled to remove the organ in every case, otherwise in nearly 50 per cent. of cases he will be leaving behind a diseased appendix. His operations will be incomplete and his patients will suffer correspondingly.

Another argument in favor of removal of the appendix as a concomitant to pelvic operations by the abdominal route is the occasional presence of malignant disease of the appendix. The cases of primary carcinoma of the appendix are multiplying since the latter has been more systematically subjected to microscopic examination. Clark has reported recently a case of primary carcinoma of the appendix in a series of 120 laparotomies for pelvic disease with coincident removal of the appendix. One year later there had been no return of the disease. A. O. J. Kelly in 1900 reported three cases of primary carcinoma of the appendix in an examination of 706 appendices removed by Deaver. There was a fourth case but it may have been secondary to a carcinoma elsewhere in the body. In the three undoubted cases the tumors were of microscopic size and were not detected by the ordinary microscopic examination. In my case also the true nature of the disease was not discovered until the systematic laboratory examination had been made. Although removed nearly a year ago there has been no sign of a recurrence. Here are five cases of primary carcinoma of the appendix in 1026 appendectomies all unrecognized macroscopically. All the appendices were removed so early that the chances of nonrecurrences are very good.

Purposely I have passed over with few comments that portion of our subject which I believe has been settled beyond doubt. Deaver, Ochsner, Kelly, and the testimony of other equally good surgeons, have proved that the appendix often becomes diseased through its close prox-

imity to diseased appendages and vice versa. Baldy is of a different opinion, but his statements lack proof. Microscopic sections in quite a few of the 200 cases in my series showed progressive involvement of the different layers of the wall of the appendix, beginning with the serosa and working inward. As far as the surgeon is concerned, it is immaterial whether this is exactly the same kind of inflammation as that where the morbid process starts with the mucosa. Suffice it for him to know that the appendix is diseased and may give rise to symptoms in a certain proportion of cases.

CONCLUSIONS.

1. Only a little over fifty per cent. of appendices removed during the course of operations for pelvic lesions will be found microscopically to be normal.

2. The remainder will show forms of acute and chronic inflammation or the result of former inflammation.

3. The average length of the appendix is between 8 and 9 centimeters. In 107 cases of the present series the average length was 8.25 centimeters.

4. The maximum length of the appendix is found between the ages of 20 and 30. After this period the average length of the appendix is less. While this diminution probably is in part due to normal atrophy, in a certain proportion of cases it is influenced by inflammatory changes.

5. Menstrual pain may be due to or enhanced by the presence of an inflamed appendix. The congestion incident to menstruation increases the inflammation and gives rise to attacks of appendiceal colic.

6. It is exceedingly difficult to differentiate between pain due to pelvic lesions and pain due to chronic appendicitis. In the present series of cases a much larger proportion of patients whose appendices were abnormal gave histories of having or having had this pain of doubtful origin.

7. The appendix is adherent twice as frequently in those cases where microscopic examination shows past or present disease. A certain proportion of adherent appendices are, however, perfectly normal microscopically.

8. Mere shape of the appendix cannot serve as an index of its normality or disease. Appendices may be club-shaped, constricted or bent upon themselves and yet be perfectly normal microscopically.

9. The appendix is the seat of fecal concretions in at least 8 per cent. of all cases. Their existence does not denote that the appendix is diseased.

10. Nearly 50 per cent. of patients with chronic disease of the appendages show accompanying disease of the appendix.

11. This inflammation may be the result of the direct contact of the appendix with diseased adnexa or infection may travel from the latter to the appendix through the lymphatics connecting the two.

12. In chronic disease of the appendages adhesions of the accompanying appendices are present in nearly 50 per cent. of the cases, where microscopic examination shows the latter to be diseased. In a certain proportion of cases, however, although the appendix may be adherent it is also perfectly normal.

13. In chronic disease of the appendages the appendix which is club-shaped, constricted or contains fecal concretions is not necessarily diseased.

14. In 50 per cent. of patients with uterine fibromata there is accompanying disease of the appendix.

15. In 70.9 per cent. of patients with ovarian cystomata the accompanying appendices are diseased. The appendix is not infrequently adherent to an ovarian cyst and may even infect the latter.

16. The ordinary median abdominal incision in the class of cases under consideration amply suffices for the removal of the appendix.

17. Such removal should neither increase the mortality nor prolong the convalescence.

18. Since it is impossible for the surgeon to determine which appendix is diseased by gross appearances alone, and since nearly 50 per cent. of appendices where the abdomen is opened for other purposes are found diseased microscopically—it is the surgeon's duty, in the absence of contraindications, to remove the appendix in every such case, otherwise he will leave behind diseased appendices which may prove a subsequent source of suffering to the patient.

19. Systematic examination of series of removed appendices show the occasional presence of primary carcinoma in such an early stage that it could not have been detected by inspection at the time of operation. Removal at this early stage means probably a nonrecurrence and the saving of a life. Even were carcinoma of the appendix not commoner than once out of 200 abdominal sections, it would still be an argument for the removal of the appendix in every case where the abdomen is opened for other purposes.

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SUCCINIC PEROXID—(ALPHOZONE).*

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Detroit.

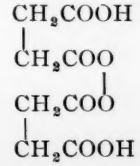
Within recent years developments in pathology have shown that infection by micro-organisms must be considered as the chief etiologic factor of disease conditions. The importance of these developments cannot be overestimated, for through their instrumentality not only has the treatment of a great many disease processes been placed upon a rational basis but physicians have thereby been enabled to institute measures which are effective in their prevention.

It is now an established fact that nearly all pathologic conditions of common occurrence are due either directly or indirectly to the action of pathogenic germs. The basic principle of rational treatment is: remove the cause and the effect will cease. This means, substantially, destroy the germs and a cure is effected. So long as the offending germs are present and active in the affected organ or tissues, just so long will the diseased condition persist. Hence, it follows, that we must look to measures that will destroy or inhibit the growth and multiplication of these micro-organisms as our best means of combating pathologic conditions in general.

This is my reason for bringing to your attention today succinic peroxid, a recently discovered chemical compound which is a powerful destroyer of disease germs and which bids fair to eclipse all other germicidal substances yet produced. It has so many desirable properties, I firmly believe it will prove to be one of the most valuable of modern additions to the physician's armamentarium. This compound may have a number of technical names, such as succinic peroxid, disuccinyl peroxid, etc., but its simplest title, and the one by which the profession will know it best, is Alphozone. This latter, for the sake of simplicity, I will employ in this paper.

Alphozone was discovered by Prof. A. M. Clover, of the University of Michigan. Prof. Clover no doubt has devoted more research study to the chemistry of peroxids than any other chemist, and Alphozone is the outcome of his extensive investigations. Alphozone is an American product, through and through, and one to which we can point with pride. Germany is noted for her synthetic chemicals, so much so that a great many physicians have begun to believe that everything of the kind must of necessity be "made in Germany." It is true Germany has produced a large number of valuable compounds, many of which are extensively employed in this country, but this does not mean that American chemists cannot, in the field of chemistry, make discoveries of equal importance.

As the name "succinic peroxid" suggests, Alphozone is an organic peroxid and is derived from succinic acid. It has for its empiric formula, $C_8H_{10}O_8$, which may be writen structurally, as follows:



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All peroxids are related in as much as they contain an unusually high percentage of oxygen. The simplest peroxid is hydrogen peroxid (H_2O_2) and with this you all are, doubtless, more or less familiar.

To show its chemical relation to hydrogen peroxid, Alphozone may be considered as being derived from hydrogen peroxid by the replacement of each atom of hydrogen in the molecule by a succinyl radicle ($C_4H_5O_3$). Thus:

$$\begin{array}{ll} H—O & C_4H_5O_3—O \\ | & | \\ H—O & C_4H_5O_3—O \end{array}$$

There are numerous organic peroxids, but Alphozone is the only one that possesses, *per se,* any decided germicidal power. However, organic peroxids which in themselves are not germicidal develop this property after a time when dissolved in or mixed with water. They combine with a small portion of water and form new compounds. This change is known as hydrolysis and the products as hydrolytic products. The products formed are the corresponding acid and peracid. In the case of Alphozone the products of hydrolysis are succinic acid and succinic peracid. These peracids are all germicidal but vary in their potency. A great disadvantage in employing organic peroxids other than Alphozone is that hydrolysis takes place very slowly so that the germicidal property is not available until several hours have passed, and this necessitates the preparing of solutions some time before they are to be used.

The peracids on standing in solution for several days finally hydrolyze into the corresponding acid and hydrogen peroxid.

Alphozone closely approaches the ideal germicide, for, besides its high germicidal value, it is soluble, colorless, stainless, odorless, is non-poisonous, non-volatile and practically non-irritating. It is non-explosive under the most rigid tests. It does not coagulate albumin. It is also non-corrosive to animal tissues and non-hygroscopic.

Alphozone is a fluffy, finely crystalline powder. It is, therefore, convenient to transport or carry and is always ready for instant use by simply dissolving it in water. Such solutions are clear and colorless.

The ready solubility of a germicidal substance is a very important quality and one which every physician fully appreciates. Solutions of Alphozone a hundred times too strong can be made in a short time, and those of a strength usually required can be made almost instantly. Solutions of Alphozone, it should be remembered, do not retain their strength indefinitely, owing to the hydrolysis which slowly takes place. Reduction in germicidal power is hardly noticeable up to nearly a week, the length of time depending upon the strength of solution. It is advisable to make solutions of Alphozone at the time they are required, for then they will be reliable in every instance.

A germicide in liquid form meets the most requirements of the physician and surgeon. A germicidal powder has a number of uses, but a germicide in the form of gas is of limited application. Alphozone may be used in two of these forms—liquid and powder. As a powder it may be used pure if required, or, for ordinary purposes, diluted with 10 to 100 parts of some suitable powder, such as boric acid, talcum, etc.

The nontoxic property of Alphozone is one of its important characteristics. This

nontoxicity is readily apparent when it is remembered that the ultimate products of the hydrolytic decomposition of Alphozone are succinic acid and hydrogen peroxid. Being such an innocuous chemical there need be no fear of untoward results from its general use, and for this reason it can be freely used internally as well as externally. Alphozone may be employed in place of almost all of the many germicides and antiseptics now in use. As it is odorless and stainless, it will most agreeably displace those having offensive odor, as well as those possessing staining properties.

The germicidal energy exerted by Alphozone is most surprising, and it is remarkable that a nontoxic germicide can be so energetic. In the minds of most physicians high germicidal value is associated with toxicity, but in Alphozone we have a substance that is not excelled in germicidal value, not even by mercury bichlorid. Being equally germicidal with mercury bichlorid, as comparative tests thus far indicate it to be, Alphozone can be used in every instance where this substance is indicated and also in every instance where the bichlorid would be desirable if it were not for its toxicity and easy absorption. Alphozone may be substituted for mercury bichlorid in every instance as a germicide and in the same strength solutions, as it has none of the prohibitive properties of the latter. Authoritative investigators state that the germicidal point for a 1-to-5000 mercuric chlorid solution is 15 minutes. It is found that the germicidal point for a 1-to-5000 Alphozone solution is 7.5 to 15 minutes.

One of our best known and most used germicides is carbolic acid. By the ratio of their germicidal value as evidenced by comparative tests, Alphozone is 75 times stronger than carbolic acid. Besides this marked difference Alphozone has none of the undesirable properties of carbolic acid. It is not toxic or escharotic and, unlike the carbolic acid, is free from disagreeable and persistent odor. Alphozone is an advantageous substitute for carbolic acid in many of the general uses of the latter.

The popularity of hydrogen peroxid as a germicide is due to its ease of application, its nontoxicity, its being odorless, colorless, stainless, its slight irritating properties and to its quite marked germicidal value.

It was perhaps the most all-around satisfactory germicide up to the time of the discovery of Alphozone. Alphozone has *all* of the favorable properties of hydrogen peroxid and others that are characteristically individual. By a germicidal comparison, Alphozone is over 100 times stronger than *absolute* hydrogen peroxid. Repeated experiments, under the same conditions, prove that a solution of Alphozone 1 part in 7500 (1/75 of 1 per cent.) will kill typhoid bacilli in the same time that is required by 1 part in 66 (1½ per cent.) of absolute hydrogen peroxid. The action of Alphozone solutions upon pus and blood is much the same as that of hydrogen peroxid solutions, except the effervescence. There is a general belief among physicians that hydrogen peroxid destroys pus. This belief seems to be not well founded for test-tube experiments do not verify it. If 1 cubic centimeter of pure pus be placed in each of two test-tubes and to one be added 10 cubic centimeters of physiologic salt solution and to the other 10 cubic centimeters of a 3 per cent. hydrogen peroxid solution in small portions till effervescence ceases, shaking

both vigorously for a few minutes, then allowing them to settle, it will be found that there is about as much pus (as sediment) in the tube upon which the hydrogen peroxid acted as in the tube containing the salt solution in which there was no action, which quite conclusively shows that pus is not dissolved by hydrogen peroxid. In this experiment, using salt solution and hydrogen peroxid 100 times in excess, does not modify the results. This belief, that pus is destroyed by hydrogen peroxid, is probably based on the fact that the pus is displaced by the mechanical action of the escaping oxygen. This mechanical displacement is a cause for harm in confined spaces, as the pressure produced forces more or less of the pus and micro-organisms it contains into the surrounding tissue, thus increasing the infected area.

Blood is quickly decolorized by Alphozone solution. A drop of blood added to 10 cubic centimeters of a 1-to-1000 solution soon results in a nearly colorless mixture. If 1 cubic centimeter of defibrinated blood be added to 10 cubic centimeters of a 1 per cent. solution of Alphozone, it is changed to a clear, pale yellow solution. Alphozone solutions have more or less the bleaching properties of hydrogen peroxid.

Formaldehyd is at present considered one of our most valuable disinfectants. Its greatest value lies in the fact that it can be used in the gaseous form.

It is the belief of almost every physician that formaldehyd is intensely germicidal, but such belief is not well founded for, in truth, the 40 per cent. solution has about the same germicidal value as carbolic acid. Repeated tests prove that it requires 30 minutes for a 1 per cent. solution to kill Staphylococci pyogenes aureus. A 1 per cent. solution of carbolic acid will kill the same germ in the same time. A 2 per cent. solution of formaldehyd and a 1/50 per cent. Alphozone, each, kill staphylococci in 10 minutes, or, in other words, a 1-to-10,000 Alphozone solution kills staphylococci in the same time as required by a 1-to-100 solution of formaldehyd. Therefore, Alphozone is germicidally 100 times stronger than formaldehyd (40 per cent. solution).

(Vanderlinder and De Buck state that corresponding solutions of formaldehyd are not more germicidal than carbolic acid.)

Comparing Alphozone with other well-known germicides, it can be said that it is six times stronger than silver nitrate, 25 times stronger than tricresol, 50 times stronger than lysol, 60 to 75 times stronger than creolin, 100 times stronger than potassium permanganate, 200 to 250 times stronger than salicylic acid, 350 times stronger than a solution of Seiler's tablets, (two tablets to the ounce), 400 times stronger than eucalyptol, 2500 times stronger than the listerine-like compounds.

From the foregoing it will be obvious that Alphozone has a wide field of usefulness, both in surgery and medicine.

Alphozone will be found a convenient agent for the sterilization of the hands, local surface areas, certain surgical instruments and appliances, dressings, sponges, rubber sheeting, etc.

For the sterilization of the hands, the method and suggestions by Welsh or Lockwood may be followed, substituting Alphozone for the bichlorid or biniodid of mercury. Controlled experiments following above suggestions gave disinfection of the hands. Local surface areas for

vaccination or for hypodermic injection may be quickly and thoroughly sterilized by a 1-to-500 to a 1-to-1000 solution.

Surgical instruments of metal or rubber may be sterilized by washing them or placing them in a proper solution of Alphozone. Controlled experiments carried out under conditions as near practical as possible, using a 24-hour bouillon culture of pus from a postoperative abscess, gave sterile instruments in less than a minute with 1-500 or 1-1000 solution of Alphozone. It is not advisable to leave instruments in Alphozone solutions for any great length of time, especially if there be any iron surface exposed, as Alphozone solutions are slightly acid and the salt formed is quickly oxidized and the surface may be attacked. Nickel, silver and rubber instruments will suffer no harm in Alphozone solutions.

In fact Alphozone is indicated wherever pathogenic germs are present and it can be brought in contact with them.

It is useful in all inflammations of mucous membranes, in ulcers and abscesses that can be reached by germicidal solutions, erysipelas, tinea tonsurans, and other cutaneous infections.

It is of value in typhoid fever, infectious diarrhea and dysentery, cholera, and other gastrointestinal diseases of microbic origin.

Alphozone may be used as a surgical dusting powder or an insufflation, properly diluted. In solution it may be employed as a wash, spray, douche, gargle or injection. Combined with soft petrolatum, it forms an excellent ointment for many conditions.

Before closing, I wish to acknowledge my indebtedness to Mr. M. L. Trowbridge, of Detroit, for valuable data on the bacteriology of Alphozone drawn from his experiments.

CAUSE AND TREATMENT OF PUERPERAL ECLAMPSIA.*

A. N. COLLINS,
Detroit.

When your Secretary requested me to bring this well-worn subject before you, I confess I felt like begging to be excused—not that I deemed the subject unimportant, but because I could bring to you so little that is new, so little that is definite and satisfying, especially as to its etiology.

The importance of the subject is obvious to all. Its importance to the general practitioner, who deals with by far the greater number of obstetrical cases, is probably second to none. That any one assuming to care for an obstetrical case should have a very clear conception of this condition, as well as the most successful methods of meeting this virulent malady, cannot be denied. We trust we may be pardoned for reviewing this subject, though worn threadbare, when we are compelled to record a mortality of from 20 to 35 per cent. of all mothers, and a mortality of about 50 per cent. of all children who are attacked by this malady—a mortality which I feel sure

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could and should be very greatly reduced were there a more general practice of what is already known and proven.

Eclampsia, or the auto-intoxication of pregnancy, has been, is and will still continue to be, one of the greatest causes of anxiety to the obstetrician.

An acute, morbid condition, manifesting itself during pregnancy, labor, or the puerperal state, by one or more convulsions, affecting first the voluntary, and secondly the involuntary muscles, complete loss of consciousness ending in coma, often death, we term *Ecalmpsia.* The condition upon which it depends we term the auto-intoxication of pregnancy.

The time of the appearance of eclampsia in relation to labor is somewhat in dispute, but observations seem to prove that more seizures are recorded late in the period of gestation than during or succeeding labor. Undoubtedly the condition of auto-intoxication and especially the convulsions, tend to precipitate the labor, and cases really belonging to the late gestation period become synchronous with those of the period of labor.

Whatever the period of the explosion, the cause remains the same. It is only in treatment that the period has significance. Most competent observers place the greater number of seizures in the late gestation period, less in the period of labor, and least in the period succeeding the emptying of the uterus.

Estimates of the frequency of the occurrence of this malady vary. In tabulating records covering 46,000 cases, statistics from Dresden, Paris, Prague and Boston, it occurred in 363 cases, a ratio of one case to every 126 pregnancies.

The ratio varies greatly at different times. In Tarniers' clinic, in 1872, it occurred once in every 47 pregnancies, as compared with one case in 730 labors in 1882, and one case in every 130 labors in 1891.

A disease in which the mortality ranges from 20 to 35 per cent. (and many statistics as high as 40 per cent.) in the mother, and about 50 per cent. in the children, occurring in about every 125 cases of pregnancy, cannot but impress us as a most serious condition, worthy our best efforts to make in the future a better showing than we have made in the past.

The gravity of this affection renders a study of the causes which underlie this serious malady of paramount importance. It is indeed lamentable that I am not able to bring before you in the present state of our knowledge, a definite, satisfactory, rational etiology.

So far nearly all our working has been based upon mere theories, unproven suppositions, and more or less reasonable hypothesis. There is much work still to be done on this subject before we arrive at the solution of the problems: Whence comes this virulent disturber? How or where is it produced? Why, only in pregnancy? What organs do too much or too little? Where is the physiological activity which becomes deranged, resulting in the development of this ferment, substance, toxin or accumulation—call it what you will—that so demoralizes the normal functions of the metabolic and eliminating organs, resulting in this pathological cyclone, which deranges and destroys the fine machinery of existence?

In the obscurity now surrounding the causes of this auto-intoxication, we cannot do better than glance at the various theories and ideas that have obtained.

Very early, in the twilight of our science, the attendant witnessing the con-

tortions and agony of a victim in the grasp of this malady, easily solved the problem by the prevalent idea of devilish possession. If swine could be seized with madness through occupation by his satanic majesty, and dash frantically into the sea, why not woman? Both were considered of about equal importance in the theological sophistry of that time.

Witches, too, came in for their share of abuse, and the person who had been guilty of thus bewitching the sufferer was diligently sought that they might be burned at the stake—drawn and quartered, or gently hanged, according to the benignant theology of that time.

Undoubtedly the earlier observers placed more stress upon mechanical causes than has obtained since the time of Bouchard, who insisted that all pregnant women suffer more or less from an auto-intoxication, the result of retention of certain poisonous substances in the blood, holding that there is an increased toxicity of the blood serum and a decrease in the toxicity of the urine. These statements have not been satisfactorily proven.

Among the mechanical causes we may mention pressure of the gravid uterus upon the afferent and efferent blood vessels of the kidneys—pressure upon the ureter, thus interfering with the normal function of the great filter, crippling the kidney until it is unable to rid the system of many deleterious and poisonous products.

Pressure upon the aorta and vena cava, with its influence upon the proper functions of both liver and kidneys.

Pressure upon the splanchnic nerves, thus destroying the normal relation between matabolism and elimination.

Deleterious substances in the blood—ammonuria, hydremia, acetonuria, extractive matter found in the urine, normally but retained in the blood in pregnancy.

Ludwig and Savor believe that the auto-intoxication is caused by a ferment originating in metabolic processes, not showing itself in the organism during gestation on account of the processes of metabolism, eclamptic symptoms expressing the action of the ferment. After the convulsion the ferment is removed by the kidneys. The exact origin of this ferment, whether it depends upon the hepatic lesions or whether it offers a connecting link in the synthesis of urine, can be cleared up only by further experimental work. They believe the offending substance to be carbamic acid.

At an early period it was considered a disorder of the nervous system. That the nervous system in pregnancy is in an unstable state seems proven. Convulsions in pregnant animals could be produced by less quantity of creatinin, powdered upon the cerebral cortex, than in unimpregnanted animals. This theory has recently been revived by Herff.

Leves identified eclampsia with uremia. His conclusions were only slowly abandoned, as further investigation proved that the two conditions had but little in common.

Undoubtedly the theories of Bouchard have been productive of greatest results. His theory of auto-intoxication and retention of poisonous material, came nearer an explanation of the phenomena of eclampsia than any prior theory.

Ludwig and Savor believe the intoxication due to the products of fœtal matabolism—that these products added to the normal maternal products overtaxed the eliminating powers of the mother, thereby

permitting an accumulation of poisonous products, producing the explosion.

From this mass of theory we may summarize at present by stating that we have presumptive evidence of some poisonous substance circulating in the blood, which gives rise to numerous thromboses in the smaller vessels, with consequent necrosis and foci of degeneration in the various organs—notably the liver and kidneys—and that these thrombotic necroses markedly impair the metabolic and eliminant activities of those organs, thus further and further heaping up the deleterious poisonous substances, establishing a vicious circle of imperfect matabolism and imperfect elimination which results in the phenomena of eclampsia.

We are ignorant of the nature, source, mode of action or type of this poisonous substance; also, that this poisonous substance really exists from the experimental evidence thus far adduced, we are not sure that we have any such poisonous circulating factor. We cannot prove it as yet.

Notwithstanding this frank confession of ignorance, there is much of value, practically, in our clinical knowledge of this disease.

Predisposing Causes.—Among the predisposing causes we may place easily first and foremost any impairment of the renal filter. We have presumptive evidence of a toxemia—elimination must rid the system of this poison.

As exciting causes or causes tending to embarrass this renal filter, we have all diseases of the kidneys.

Pressure upon the ureters and blood vessels, as in hydramnios—twin pregpregnancies, or retention of urine. Since a growing fœtus is the one absolute condition of eclampsia we must conclude its genesis in utero contains the potential of eclampsia.

Statistics show an occurrence of eclampsia in 11 per cent. of multiple pregnancies, as compared with one and one-tenth per cent. in single pregnancies, while a further proof of the effect of pressure is shown by statistics of pregnancies in extreme youth or extreme age, owing to the rigidity of the muscles and limited pelvic and abdominal space in these cases. The proportion of eclamptic primipapare to multipare is as 3 to 1.

The exciting causes, when the characteristic toxemia is present are usually abrupt suppression of the urine—partial or complete—constipation, painful uterine contractions, rigidity of the os, or introitus vaginæ in primiparæ, excessive emotions, or any decided nervous shock or emotional disturbance.

Although the pathology of this disease is not under discussion, a hasty glance is necessary if our discussion of treatment be logical. Pathology and treatment cannot well be separated in this or any other disease, if we are to avoid the empiricism of the past.

Not infrequently are found no changes in the brain, cord, chest or abdomen. When found in the brain, they consist of hyperemia of the brain and membranes with serous infiltration, apoplexy of the brain and membranes, or meningitis. Anemia of the brain is sometimes found.

Oedema of the lungs often causes death. In the kidneys we find significant and noteworthy changes ranging from hyperemia to the second stage of nephritis. Seldom have the changes gone on to the third or atropic stage.

The kidneys are almost always diseased. Schmorl held 73 autopsies; he found diseased kidneys in 72. Glocker in

368 cases found diseased kidneys in 361 of the 368 cases.

A striking feature is that these changes are not inflammatory, but degenerative changes in the tubular epithelium, cloudy swelling, fatty degeneration and local necroses.

Thrombi, hyaline and fibrinous are often found in the glomeruli.

Changes in the liver are most important, ranking second only to the kidney changes.

Glocker found 20 characteristic changes in 26 autopsies.

In Schmorl's 73 cases, he found 71 cases in which the liver showed the characteristic pathology, which consists of enlargement, superficial yellow spots and stripes, large red patches; in the center are necrotic liver epithelium, degenerated red blood cells; in the capillaries and small portal vessels are found. Thrombi-anæmic necroses of the liver epithelium are also found.

In other organs are found these thrombi and degenerative changes. Schmorl in his 73 autopsies found thrombi present in the lungs in 66 cases—hemorrhages and softening in the brain in 65.

Winckler found in six out of seven autopsies minute hemorrhages and softening. In the heart Schmorl found minute hemorrhages, accompanied by necrotic cells in 42 of the 73 cases. Hemorrhages and necrotic spots are frequent in the suprarenals and pancreas, as well as in the gastro-intestinal tract. Often are found not only capilllary thrombi, but emboli of cells from distant organs or structures. Giant placental cell emboli are sometimes found in the liver.

Such is the horrible state of affairs in this disease, as shown by the pathology. Can any sane man look at this pathology and expect brilliant results from any known medicine or method, however or whatever given or done, when once these changes have been wrought? From the pathology and from the fearful mortality, we conclude treatment never can nor never has been but moderately successful, when once the eclampsic seizure is upon us. What we do to be of value must be done prior to these marked destructive changes. Whenever they have taken place we are powerless in many cases. In the presence of the convulsion previous to or during labor, to arrest the convulsion is obviously our first indication. Chloroform, morphine, chloral hydrate, and veratrum viride have found most favor. Chloroform is most efficient, arresting the convulsion and giving us time to formulate a plan of further action, which depends upon the character of the case to a large extent. No routine treatment can be followed in these cases. To arrest the convulsion is imperative, to prevent a recurrence if possible, our aim. One convulsion may be fatal. The danger increases with each succeeding seizure, its gravity being marked by the length of the period of unconsciousness succeeding the spasm. Some authorities state that 18 seizures are always fatal; others place the number as high as 30. To eliminate the poison as rapidly as possible and arrest the accumulation is our plain duty. In the majority of cases but one procedure does this effectively. Emptying the uterine contents as rapidly as possible, without injury to the maternal structure, promises more in saving the life of both mother and child, than all other means known. Fortunately in most cases, the labor sets in before or at the time of the seizure. In these cases

our pathway is well marked—there need be no hesitation. After controlling the spasm with chloroform, proceed to deliver with due regard to the well known principles of rapid delivery. If we can succeed in evacuating the uterus, we have removed our patient from a class in which 20 to 35 per cent. die, to a class in which good observers state that the convulsions cease immediately or soon after delivery in about 94 per cent. of cases. In primiparae, and in some other cases, rapid delivery cannot safely be done, but they are few, and should not weigh against this efficient procedure when it can be done safely. Careful dilation with the hand is usually efficient to relax the os to a point of safe delivery. No doubt cases where the cervix is not obliterated, where there is rigidity of the internal os, will compel the selection of the expectant plan of waiting until the uterus can be safely emptied or the vaginal Cæsarean section performed. As soon as possible the eliminating organs should be made to do all the work possible. Free catharsis with croton oil, calomel, compound jalap powder, saline, subcutaneous and rectal injections, dry hot bath, hot pack, venesection, replacing the blood with normal saline solution, all may become a part of the active treatment of these cases. Veratrum viride deserves a high place in the treatment of the seizures. 10 to 20 M. of a reliable fl. ex. hypodermically, repeated every half hour till the pulse rate falls to 60, will usually prevent the seizure. It relaxes the spasm of the arterioles, and acts as a diuretic. It is of most value in the sthenic cases. Caution should be observed in keeping the patient in the recumbent position when using this powerful drug. It has proven to be of great value in all cases. Many place it first in the list of remedies. Personally, I believe it our *most valuable* drug at present.

Chloral hydrate well diluted, by mouth or by rectum, is very often used and has undoubted merit. Morphine in proper cases has met with great favor by many reliable observers. It has also met with much opposition. It is given in large doses to control the spasm, and relax the arterial tension. It seems to prolong the post eclamptic stupor, a result certainly not to be desired. There can be no doubt, in properly selected cases, of its value.

Sulphate of magnesia by high rectal injection in solution, irrigation of the bowel with warm saline solution, drinking when possible large quantities of saline water, all tend to assist in the elimination so much needed.

Oxygen as a general stimulant to assist the eliminating function of the lungs, to sustain life in the post eclamptic stupor, is by some pronounced invaluable. Venesection has proven of value.

It seems certain that with prompt treatment much can be done in these cases, but in view of the changes already wrought, no method of procedure will avail in many cases when once the eclampsia is upon us.

In proper prophylaxis, in anticipating this condition, we must do our best work. The prophylactic treatment becomes really the most practical part of our study. By careful observation of the pregnant woman, we have in the great majority of cases fair warning of the creeping on of this auto-intoxication which leads to eclampsia with its dangers and uncontrollable tendencies. The effectual treatment of eclampsia must be before the auto-intoxication and degenerative changes have gotten beyond our control.

If we instruct our patients as early as the fourth month of gestation in regard to diet and the necessity of careful examination of the quality and quantity of the urine at stated intervals, these intervals being shorter, as gestation approaches full term, we can almost positively escape eclampsia in cases that employ us early and who are of average intelligence. No doubt some cases give very little evidence of this auto-intoxication, but they are fortunately very few who do not. Among the more certain and constant signs of this auto-intoxication of pregnancy, we have deficient elimination of urea, albumenuria, and a train of symptoms accompanying the condition—a certain amount of headache, nausea in the later stages, flashes of light, sometimes oedema, constipation, sleeplessness, ocular disturbances, such as flashes of light, vertigo, faintness, anemia, rapid and irritable heart action, all of which or any of which should put us on our guard.

Usually our first significant observation will be a decrease in the quantity of the urine, often showing albumen, and always showing a deficiency of nitrogen, practically demonstrated by the quantity of urea, urine of low specific gravity, unless a large amount is passed, should at once make us suspicious. Observing these symptoms, highly nitrogenized food, such as meat and eggs, should be avoided, milk substituted, the bowels and skin kept active, large quantities of water injected, and the whole eliminative apparatus put in as active condition as possible. Under appropriate care and treatment, many cases will clear up, the albumen practically disappears, the elimination regains its normal, and the subjective and objective symptoms are relieved.

If by our treatment we cannot abate these symptoms, if they persist and grow more marked, we should not hesitate to induce premature labor, waiting till the child is viable, if possible and safe, but never unduly jeopardizing the mother's life to save a child which, if we permit the condition to go on, has but a slight chance of ever being born alive.

This treatment will reduce the mortality in pregnancy from this fatal malady in two ways, by decreasing the number of cases of eclampsia per thousand to very few of those applying for treatment, and diffuse a much needed knowledge of this condition among the laity, increasing the number of those who apply early for the physician's care, not only for the actual confinement, but what is fully as important, a proper preparation for that event.

TO RECAPITULATE.

Eclampsia is a preventable disease. When not prevented it is an incurable disease in from 20 to 35 per cent. of the mothers attacked, and from 30 to 50 per cent. of the children. It is due to an auto-intoxication, which can be detected by careful examination of the urine in nearly all cases in time to avoid the dangers of eclampsia. No matter what treatment is instituted, many cases will continue to approach the danger point, unless we terminate the pregnancy prematurely. We should wait, if practical, till the child is viable before terminating the pregnancy. We should terminate the pregnancy regardless of the viability of the child in urgent cases, as our only efficient means of curing the disease.

ECLAMPSIA AND VAGINAL CÆSAREAN SECTION.*

J. H. CARSTENS,
Detroit.

Puerperal eclampsia is such a terrible disease and comes on so suddenly and often unexpectedly that the most prompt, energetic and heroic treatment is necessary in many cases to save the patient.

It is not only the danger of death in these cases, but also the especial liability of permanent injury of some of the special senses, that necessitates prompt action. Many cases have their eye sight injured; some even have progressive atrophy of the optic nerve. Some loose the sense of smell; some have paralysis of certain muscles as a sequel.

Hence, all around, it is the most serious condition occurring in the puerperal state. The many other papers on that subject cover the cause, general management and medical treatment of these cases, so I will only take up the surgical side of the question.

Mild attacks of eclampsia are readily controlled by medication and other treatment which is used to remove the cause, or to terminate labor at leisure. The kind I want to refer to is, that severe variety characterized by a series of convulsions recurring every fifteen to thirty minutes or an hour, accompanied by the most profound coma and not relieved by medication. The patient continues in this state for 12, 24 or 48 hours and finally dies undelivered. Sometimes even labor sets in and by manual effort, dilatation with rubber bags, your hand, or steel dilator, labor can be sometimes finished in a short time. In puerperal eclampsia it has been found that the convulsions cease as soon as the labor is completed. There are exceptional cases where the convulsions still recur afterwards although mild, and there are still other cases, though very rare, where attacks do not come on until after labor is finished. Hence the great object should be to finish labor as quickly as possible. An hour, half-an-hour, minutes even may be of importance in saving the patient's life or some vital part of the body.

This can be most easily accomplished by classical Cæsarean section that has been recommended and employed, but as this Cæsarean section is more or less difficult. Duhrsen has recommended what he calls "Vaginal Cæsarean Section"—opening the cervix sufficiently to be able to apply forceps or deliver by version. This is an operation not difficult and not dangerous, and can be carried out by any general practitioner and delivery accomplished in five or ten minutes.

The operation is performed as follows: An incision is made at the junction of the cervix and the bladder, transversely across about an inch or 1½ inches in length down to the uterine muscles. With the handle of a knife the bladder can be easily separated and lifted up for an inch or two inches. The peritoneum is not opened. The cervix is grasped on one side with vulsellum forceps, or what is better, with one on each side. The cervix is now cut from without inward as near the median line as possible, up to the internal os, or a little farther. If you stick

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to the median line there will be very little hemorrhage, but if you get on one side or the other there seems to be a good deal more. The uterus being opened you can easily turn or apply the forceps and deliver in a few minutes. If the incision is not long enough you can increase it. The placenta can then be removed by inserting the hand. I have used hypodermic of ergot, as a rule, before I start the operation or use the chloroform, so as to get good contractions as soon as the fœtus is removed. When the uterus is emptied it can be easily pulled out of the vulva. Catgut sutures (or for that matter any other kind) are used to sew up the opening and stop the hemorrhage. The little oozing that has taken place with the first cut through the mucous membrane at the junction of the bladder and uterus has stopped by this time, and a few sutures introduced to close up the mucous membrane. The whole operation should not last more than 15 minutes. The little hemorrhage, that you can readily control, will do no harm as you have not opened the peritoneal cavity and your patient has been promptly delivered and the convulsions cease.

In conclusion I simply want to make these points:

1. Severe continuous puerperal convulsions are often fatal or leave serious sequelæ, hence require the most heroic treatment.

2. Vaginal Cæsarean section enables the accoucher to deliver promptly.

3. Prompt delivery affords the best, in fact, only chance for success.

DISCUSSION ON THE PAPERS OF DRS. COLLINS AND CARSTENS.

J. J. Mulheron, Detroit: I would not mystify this subject any more by attempting to review the pathology of the affection. It is a notorious fact that puerperal eclampsia is one of the least understood, or the most misunderstood, of diseases. Dr. Collins has gone over the field and given us the various theories which have, from time to time, been advanced, and you cannot have failed to notice from his review how mixed we are on this subject.

I want to take exception to one remark that he made, particularly with regard to the observations made by Ludwig and Savor. I think the doctor has misunderstood the conclusions of these gentlemen. He says they attributed the source of the materies morbi to the fœtus. It was my fortune to be present during a considerable portion of the time with Ludwig and Savor when they were making these observations, and that was not the conclusion that they then reached. They regarded that as one of the possible sources of the poison, but they were inclined rather to believe the origin was through some disturbance of metabolism, in which the liver was chiefly at fault. I remember the enthusiasm with which they entered upon the subject, and the amount of material they had at their disposal. At the lying-in hospital at Vienna they average fifty cases of labor a day, and the aggregate of eclampsia occurring there is very large.

Another point is, Dr. Collins' declaration that puerperal eclampsia is a preventable disease. I take exception to this statement. I think cases will occur occasionally where every precaution will fail in preventing an onset of the attack. I want to report one case as an illustration. A number of gentlemen will remember the very interesting paper which Dr. Bonafield, of Cincinnati, read before the Wayne County Medical Society, in which he advanced the idea that veratrum viride is almost a specific in puerperal eclampsia. I had at that time a patient under my care, who had been sent to Detroit from Chatham, Ontario, where she had developed symptoms of the disease. The physicians she consulted at Chatham advised that she be immediately taken to the hospital and prematurely delivered. The symptoms, in their judgment, were so threatening as to demand immediate interference. She did not like the idea and coming to Dtroit I was engaged to take care of her. I found the secretion of urine down to six ounces in twenty-four hours. I put her on Basham's mixture, fed her buttermilk or skimmed milk, and was fortunate at the end of a week in increasing the secretion to twenty-four ounces and later it went up as high as twenty-eight ounces. The woman went along, and every symptom of favorable outcome developed. She went

a little over the time she was expected for confinement. I was sent for when labor set in and got there about eight o'clock in the evening. At four o'clock in the morning I delivered her of a boy (the child weighing fully eight pounds) without the slightest untoward complication. You can understand I was very apprehensive of a convulsion, and applied the forceps just as soon as dilatation was complete, no difficulty being experienced in delivering her. Everything was very promising, and all supposed we had averted a catastrophe. I called around the same day at ten o'clock and found everything doing very nicely. Everybody was pleased, as the case was a peculiar one, and a great deal depended upon the birth of the child. At nine o'clock p. m. I was sent for. I did not happen to be in. Dr. Lake, of our city, who lives in the neighborhood, was called and when I got home about eleven o'clock I went down and found Dr. Lake in attendance on a case of violent puerperal eclampsia. He had given a dose of croton oil, had erected a tent over the bed and was applying hot dry air. He had given three twenty-drop doses of veratrum viride. I entered the room just as the woman was having a convulsion. There had been no cessation as the result of the treatment. It was the ninth case of puerperal convulsions which it had been my fortune to treat. In the eight previous cases I was fortunate in having a recovery in each case. I had never seen a fatal case of puerperal eclampsia, which was certainly a singular run of good luck. My treatment had always been venesection. I immediately opened the vein in the woman's arm and withdrew twenty ounces of blood. The convulsions ceased immediately. I left again about four o'clock in the morning, and left the woman sleeping nicely. Called around the next morning about nine o'clock and found her bright and cheerful, mind perfectly clear, very happy and everything promising well. At nine o'clock that same night I was again summoned and found the woman in a violent convulsion and in a comatose condition from which she did not recover.

Now here was a case in which every known precaution had been taken, and the eclampsia was not averted; a case in which labor was normal, practically, and in which the emptying of the uterus did not avail towards the averting of the catastrophe. So that while Dr. Collins' remarks may, in a general way, be correct, I mention this striking case, which has just happened in my experience, to illustrate the possibility of exceptions to what may be a very general rule.

Mortimer Willson, Port Huron: I wish to express my appreciation of these two papers, and very briefly to relate a case which came under my observation, to which I was called in 1902 by Dr. W. P. Derck, of Marysville. He knew nothing of the history of the case; he had not seen her since conception until they sent for him one evening and said the woman had become blind. He went to see the patient, and while he was making a slight examination she had violent convulsions. She had not had one before she became suddenly blind. He sent for me. I was there in about an hour. I took a lamp and went to the bedside and held it before her eyes, and said, "Can you see anything?" She said "No." I said, "Can't you see a lamp?" She said, "No." While making a slight examination, she again passed into a violent convulsion. Dr. Derck gave her chloroform—it was about the seventh month or a little beyond probably—he gave her chloroform, and in about 45 minutes, by rapid dilation, I delivered the woman. The child had been living that afternoon, but on account of the convulsions or the violence of the poison the child was dead when born. In sixty hours she had regained normal vision, had no recurrence of eclampsia, has had no trouble with the vision since. I have had to deliver quite a number prematurely, both those who had not had eclampsia and those who had. Of course, in my own practice, if I find the nitrogenous waste or elimination falling below a certain standard which is considered the critical point, I do not wait for eclampsia, but simply deliver them. I have never had a case that demanded the pelvic or vaginal cesarean section. I think under chloroform, in any case I have ever seen myself, rapid dilatation with the finger can be accomplished and within an hour delivery effected. There may be cases in which this cannot be done, but all that I have ever seen can be managed in that way.

H. W. Longyear, Detroit: I shall not attempt to discuss the etiology and pathology of the disease which the doctor has so well given us in his paper.

There is one point of treatment that seems to me it might be well to farther emphasize, although the doctor emphasized it pretty well also, and that is the treatment to prevent convulsions. As he has very well said, that is what we have to do, principally, in these cases, and I think that is what he meant when he said it was a preventable disease. That can only be done by frequent examinations of the urine, and patients must have it impressed on their mind; they must bring it for examination during the last three months

of pregnancy, and if a trace of albumen is found that urine must be examined daily—not for the amount of albumen at all, but for the amount of urea. If you find that the specific gravity is running down in the daily amount, get the quantity and percentage of urea. If you find it getting down to the danger line, and you cannot by those methods of medication, diet, etc., which are often sufficient—if you cannot bring that urea up—you should not wait. If it gets down to the danger point, say for one, or two, or possibly three days, the woman should be delivered without delay. I deliver always, in such cases, and do not wait, because if you do in nine cases out of ten you will soon be handicapped, and will have to deliver her in convulsions, when the danger to her life as well as the child's is so well known. I think that is the point the paper should bring out more than anything else. For treatment to prevent convulsions in that stage of gestation, we should watch the urine carefully, and it can be done accurately by daily examination, when you find that albumen is present. I believe that in the convulsions veratrum veride is valuable as a remedy. Watched carefully you can bring the pulse to 45. If you find the pulse is getting too weak, it is easy to bring it up by a little alcoholic stimulant. It will respond almost immediately to a dose of brandy. Watching it that way and keeping the pulse down you can frequently stop convulsions by that treatment alone. Then the application of heat I think is valuable—building a tent over the patient and getting up perspiration. Where you get these extreme cases that Dr. Carstens spoke of, with a rigid os, when you cannot dilate, as Dr. Willson said, if you can do it with your hands that is all right. If you cannot, you have to use something more powerful. When you get to this point, when you have to come to the consideration of that, I think the Bossi dilator is all right in a good many cases, and that can be used by most any one. But the assertion of Dr. Carstens that the general practitioner can do a vaginal cesarean section is too broad. The doctor is so expert and so accustomed to his work that he thinks anybody ought to do it because it is so simple for him; but the general practitioner cannot do it. Once in a while you might find one that knows something about surgery that can do it, but the average practitioner would make a bungling job of it. I think you all know that. I don't think that statement should go out unqualified. The Bossi dilator he can use. I agree that it makes a tear of the cervix and considerable bruising, but we find that to be the case frequently in normal labor. But the Bossi dilator can be used by the general practitioner, and I believe it would be safer for him to use that than for him to make the vaginal cesarean section, which I believe is a proper operation in the hands of a skilful operator.

H. W. Yates, Detroit: I was glad to hear Dr. Longyear bring out the point in regard to the specific gravity of the urine. We may often have a normal amount of urine eliminated and a very small or deficient amount of solids. In consequence of this I believe our test should be one for the specific gravity as being much more important than one as to absolute quantity. More than that, we should frequently have microscopic examinations made to ascertain whether or not there are old kidney lesions. As up to this treatment, this thought occurs to me: Take a woman whom we know has a chronic interstitial nephritis and suppose she become pregnant. What should be our attitude towards her pregnant state? Now I believe it is conceded that pregnancy does endanger a woman who is suffering from a chronic interstitial kidney trouble. If that is so—if this trouble is increased by it—she never returns to the condition in which she was before pregnancy occurred. Moreover, the interstitial deposits will gradully become worse as pregnancy continues. Therefore, as a prophylactic to eclampsia, as a preventative of eclampsia, as Dr. Collins has put it, I believe that we are on right grounds when given such a case and knowing the circumstances connected with it, to empty that uterus at once. I believe it is wrong, knowing that the interstitial trouble goes on and on and leaves the patient in a worse condition than she was at first, to leave that uterus unemptied. I know there are many who will take exception to that on the grounds of infanticide. If pregnancy is allowed to go on and eclampsia develops death of the fœtus takes place in the majori y of those cases with great danger to the mother.

James E. Davis, Detroit: I would like to ask Dr. Collins in closing the discussion if he would develop the point brought out by

Dr. Yates, and tell us what class of symptoms we might find in cases that would be prone to eclampsia, so that we could be able to advise such patients against be om ng pregnant. As I understood Dr. Collins' paper he stated that every case might be cured if the pathological conditions had not proceeded too far. It seems to me that this point as brought out is exceedingly important, for if the uterus is emptied early enough and proper treatment instituted, then we can expect good results, but if we wait until the pathological conditions have continued so far that irreparable damage has been done, then we will not obtain good results.

Another good point brought out by Dr. Mulheron, is the value of venesection. But the employment of veratrum veride is yet better, for it substitutes the blood-letting, and the patient is bled into her own veins, which thereby conserves that amount of blood and accomplishes the same purpose.

Albert Patterson, Grand Rapids: It is not my purpose to attempt to enlarge upon the papers, but to emphasize some particular points. It has been my unfortunate experience to meet several cases of eclampsia. One case I recall where the patient lost her eyesight. Under the advice of the physician I induced labor at six months, and she was delivered without untoward symptoms—no sign of eclampsia. A little over a year she was pregnant again and went to full time and had eclampsia and died within a short time after having a few spasms. During the last two years I have had two cases in which I had opportunity to watch them from time to time. I saw them early, I limited their diet, advised a reasonable amount of exercise, baths, and carefully watched the urine from week to week. I carried them eight months and then induced labor and delivered them. Both women and babies are healthy. The babies were small, but I could deliver them rapidly because they were small. Both women had convulsions. One had three—one before I delivered her, two afterwards. After the third convulsion I bled her, probably taking 16 to 18 ounces, and she had no more convulsions. The other case I chloroformed imdiately, dilated with my hand, and delivered under chloroform. She had only one convulsion. The condition of the urine should be carefully watched in every case of pregnancy.

A. N. Collins, Detroit: In regard to Dr. Mulheron's case, I think it is exceedingly interesting. Ludwig and Savor state that the increased elimination brought about by the fœtus, had undoubtedly much to do with more matter to be eliminated than the structures could eliminate. That there was a condition depending upon the fœtus was the assertion I made. You may have pressure of every kind, so far as mechanical conditions are concerned, and you never get puerperal eclampsia unless there be a fœtus present.

Can we avoid the conclusion that the thing is dependent upon the life history of the fœtus?

In Dr. Mulheron's unfortunate case, if I did not know him so well, and know what an excellent practitioner he is, I might draw my own conclusions, if this case came to him as a suspicious case. He increased the quantity of urine, but had he carefully made, from day to day, a curve of the urea that emanated, I am afraid he would have found that curve was at a low point about the time she was delivered. That case when she came to him first, without all of these pathological changes which our postmortems have shown us do occur—and which it was the purpose of my paper to get us to stop before they do come, and to show the hopelessness when they are present—those changes ought not to have gone on. That case was a preventable case, as I asserted, had labor been brought on timely and early enough. That very case cited as one that was not preventable, was a preventable case. Any case in which labor can be brought on early enough is a preventable case. It is our business to know when it should be brought on.

Dr. Davis asked what are the symptoms to warrant us in bringing on labor. In the amount of urea eliminated I believe we have the best symptom. When you first detect this deficient elimination, when you first begin to get restlessness, sleeplessness, headache, flashes of light, and anemia, and as a rule pallor, you begin your treatment, and for a short time it is sufficient if you increase the quantity of elimination and the specific gravity of your urine. After a little the treatment ceases to avail; it goes the other way. After it has been modified by treatment everything is well for a time, and then again it goes the other way. You will find that to get the second effect from the treat-

ment is very difficult. It is then when we fail to get that second reaction, that we should bring about labor. The liver and kidneys are in a condition where they are beyond our control in a great many cases. We should not permit our cases to get beyond our control. I still assert that it is a preventable disease. This case cited was a preventable case had it been followed along in that way. Now it is a fact that very many of those cases that have spasms, and convulsions, die of ruptured blood vessels or apoplexy. What can you do with a ruptured blood vessel in the brain? The coma comes on, they will develop high fever, and will die. I assert again, those cases are preventable if they get under our observation at the proper time and if we do what we ought to do. A case ought not to get to that point where it is beyond our control, as it is a preventable condition. Our warning should be, as I say, when our treatment fails to do what it should have done; it is then that a case gets beyond our reach. Many cases will get well, but we do not know which will get well or which will die. If we watch the urine and if we have facilities to get to them, it is a preventable disease, and it is the business of the physician to stop them.

J. H. Carstens, Detroit: I want to say I strongly endorse, on the general subject, what Dr. Collins says. I think patients do not come to see the doctor soon enough. They wait until the last minute, when we are virtually helpless. We want to wait until the child is viable, if possible, but if not viable and the case progresses, there is only one thing to do, and that is, induce labor, and that we must do. It may take 12 or 24 hours, but that woman will not be safe until she is delivered and all the serious consequences prevented.

In reference to what I stated about the vaginal Cesarean section, my jocose fri nd from Grand Rapids may laugh all he likes, it has no effect on me. I am trying to teach the general practitioner something, not tell you what I can do. I know they can do it. There may be some little timidity, and their hand may tremble a little, but it takes pluck to practice medicine. To make that cut and shove up the bladder, they can do it, if they make up their mind, and there is a patient who is almost sure to die. You don't know, as Dr. Collins says, whether the third convulsion will kill her or the first make her blind. You can all do it, every one of you. Just make a cut in the cervix. The uterus can be abused more than any other organ in the body, and does stand abuse right along.

PNEUMONIA IN CHILDREN.*

LOREN CURTISS,
Paw Paw.

It goes without saying that every sick child's lungs should be thoroughly examined to eliminate the possibility of pneumonia.

It was found among seven hundred and twenty-six consecutive autopsies at the New York Infant Asylum, that three hundred and twenty-two patients died of pneumonia, one hundred and eighty-nine of stomach and intestinal diseases. One is apt to get the idea that the stomach and bowels cause most of the trouble in early childhood; but the lungs are attacked more often than any other organ. No attempt is made in this paper to differentiate the different forms of pneumonia in regard to treatment, for, according to Jacobi, nearly all the pneumonias of childhood have the pneumococcus present and nearly all are preceded by bronchitis. Only in the matter of prognosis does the

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differentiation seem to be of any practical value, for a lobular pneumonia is liable to be so long in its course as to make the outcome uncertain.

Anything that reduces the resisting power of the child's body predisposes it to pneumonia.

Carmichael says that "Pathologically as well as clinically, the study of acute pneumonia in childhood is beset with many difficulties. The pneumonic types are not so clearly defined as in the adult and differentiation is often most difficult."

Both a lobar catarrhal pneumonia and a primary acute broncho pneumonia are often met with in children.

The majority of pneumonias not preceded by bronchitis are probably due to a pneumococcus infection or to a mixed infection.

So while some pneumonias are not infectious, the difficulty in differentiating is so great that it might be well to consider them all more or less infectious; and, while a differential diagnosis will not materially modify the treatment during the acute stage of the disease, the physician, if he wishes to succeed to the fullest extent, should never cease striving to differentiate, for individualization depends upon differentiation; and to individualize is finding the key to success in the treatment of children as well as in adults.

In this paper I simply wish to bring out a few ideas in regard to the diagnosis and treatment of this common disease.

You are all familiar with the signs and symptoms of pneumonia in children—the fever, the restlessness, cough, the fast breathing. There is one however that I believe is not sufficiently emphasized and that is the pneumonic grunt. This was first brought to my attention by Dr. Seibert of New York City, who, from a very extensive experience with children for over twenty-five years, believes that the grunting respiration is pathonomonic of pneumonia and it has been my experience that when I have made a preliminary diagnosis of pneumonia from the grunt, that a physical examination has always confirmed it. Holt says that the expiratory moan is very characteristic of pneumonia.

If the importance of the pneumonic grunt is kept in view, it will aid considerably in masked cases of pneumonia. I remember a case where a competent practitioner was treating a nine months baby for meningeal trouble. This child had a grunting respiration and developed an unmistakable pneumonia and died.

If the pneumonic grunt is pathonomonic of pneumonia, there must be some specific cause for it. I have been unable to find any authority who attempts to explain why a child sick with pneumonia should have a more or less characteristic grunting respiration. If it does not occur in bronchitis then the cause is probably outside the bronchial tube. If it occurs only when the lung is involved—possibly an increased amount of residual air together with rapid breathing may so raise the tension inside the chest that it causes an explosive respiration. However, a purely mechanical explanation is hardly sufficient. It seems probable that a toxin floating in the blood may irritate the respiratory centers in the medulla and by reflex action produce this peculiar form of expiration or it may be wholly nervous in its origin. It is peculiar to say the least, that the cause has not been more closely investigated by some of our leaders in pediatrics.

When my attention was first called to this expiratory moan, I thought I had

heard it many times in other affections from which children suffer; but a more careful observation leads me to believe it to be really pathognomonic. I hope the discussion will bring out this point in particular.

Christopher, of Chicago, on page 925 of the American Text-book on Children, in an article on bronchitis, says, "Difficulty of respiration is manifest in several ways. One, by special forms of dyspnoea, particularly a grunting expiration." Later in the same article, he says a grunting expiration is one of the signs that prognosis (in bronchitis) should be guarded. This might lead us to infer that in Christopher's cases, there might have been masked or central pneumonia associated with bronchitis.

Henoch, speaking of obscure cases of pneumonia says, "Under such circumstances we should pay special attention to the character of the respiration which is hurried in comparison with the pulse, while the expiration is moaning in character."

Among other things it is well to remember that we may have a pneumonia without cough, for cough ordinarily will not be present unless the bronchial tubes are affected. We may have pneumonia without bronchial breathing, and it is the rule to have bronchial breathing over a pleural exudate in children and it is sometimes necessary to aspirate in order to differentiate, especially if palpation is not satisfactory in regard to the absence of vocal fremitus and it is liable not to be from the small amount of chest surface that you have to test from in the child, and vocal fremitus may be transmitted from the sound side of the child's lungs. The pneumonic consolidation may be situated so deep that you cannot illicit dullness on percussion. In all of these cases, so far as my experience goes, you will have the pneumonic grunt present. I have never seen a case of pneuomnia that simulated appendicitis. It would be interesting to know if the grunt is present in these trying cases.

The chest walls in children are so thin, that, unless one has special training, he is very liable to think harsh breathing is bronchial breathing and make the diagnosis of pneumonia, when he has only bronchitis to deal with, and this is most important in the diagnosis of pneumonia in children, to know bronchial breathing when you hear it. The only way to acquire a well trained ear for bronchial breathing in children is constant practice. It should be understood that bronchial breathing in children and in adults are two very different things, and I believe it impossible to hear anything like true pneumonic bronchial breathing anywhere over a healthy child's chest.

The first and most important thing about the treatment is to give the patient rest. This does not mean that it is not well to frequently change the child from the bed to the nurse's arms, which may mean rest to the little patient and may prevent a hypostatic congestion in prolonged cases. In weak patients who do not breath deep and are unable to dislodge the mucus, Jacobi advised spanking to produce crying. In this way the child's respirations become stronger and danger from atelectasis is lessened. Holt speaks well of the spanking process. Cold packs to the chest will have much the same effect and the child will breath deeper after every application.

In the matter of external applications, probably more harm is done with them in pneumonia than by either the use of de-

pressing remedies or by over stimulating, both of which are cardinal sins in treating this disease. An external application does not work by magic. If its action cannot be explained through our knowledge of anatomy and a judicious exercise of common sense, it probably does no good and may be positively harmful.

When we take into consideration the fact that there is no blood communication between the skin over the lungs and the lungs other than through the large blood vessels at the root of the neck—when we remember this, we may well ask ourselves how a mustard plaster or any of the much vaunted glycerized clay poultices can have any effect whatever in reducing the congestion of the lungs. If in addition we recall our physiology and remember that all the blood in the body passes through the heart every thirty seconds, the mystery of the action of these applications only deepens, for the faster the current the more difficult it is to control.

Pain in the chest may be relieved by counterirritation and this may be explained, possibly, by our knowledge of nerve communication; but there is no reason for placing a pound or more of medicated mud on the chest of a sick child with the idea that it is going to do anything but increase the child's already labored breathing. It cannot, anatomically speaking, relieve the congestion.

Placing the child in a hot mustard bath and rubbing him vigorously while there probably does relieve to a small extent the lung congestion, for, by applying the counterirritation to the whole body, you must necessarily increase the peripheral circulation and reduce the amount of blood in the deeper portions of the system.

It is impossible to explain why a keyhole draft on the back of the neck will be followed by a cold. It is possible that some of these, from my standpoint, objectionable applications to the chest may do good; but is it well to relish so much mystery, for as soon as we are away from the dictates of common sense, we are dangerous to our patients.

I commonly order a hot mustard bath for bronchitis. It is good in croup and will bring out a delayed irruption and so aid materially in clearing up an obscure diagnosis. It may be made with water as hot as the elbow of the mother will stand. The hand will endure being immersed in water so hot as to be painful to the child's body. One tablespoonful of mustard to a gallon of water makes a good proportion to follow. It may be used every three or four hours in pneumonia or oftener if necessary. The child will usually sleep after the bath and all the signs and symptoms be improved. I have seen many cases treated in this manner with good results in the New York German Dispensary.

In regard to medicine, Jacobi says to begin stimulation before you have a case of heart failure. But no one should give stimulants until they are called for. A teamster does not begin to whip up his horses till he comes to the hill. The reserve power in children can, as a rule, be depended upon. Realizing the fact that the disease is marked by depression and exhaustion, the strength is conserved in every way. The appetite is the supreme jewel, and nauseating medicines and syrups are to be avoided.

It is sometimes difficult to give an expectorant which has no objectionable features.

The anisate of ammonium of the Germans is both efficient and palatable and will not usually disturb digestion. It is made by taking:

Oil of anise..... 1 part.
Alcohol ....24 parts.
Water of ammonia..... 5 parts.

Of this, from one to ten drops may be given in a little water every two or three hours. It is sometimes an advantage to combine it with the bicarbonate of soda.

Fever in pneumonia, unless it ranges abnormally high, need cause no alarm. Fever in any disease in childhood, unless it causes functional or organic changes in the heart or brain, may be left to care for itself. It is certainly a bad practice to force it down by the use of coal tar antipyretics, which only increase the depression natural to the disease.

Plenty of good air in the sick room will do away largely with the demand for inhalations of oxygen.

Dr. Holt has thought enough of inhalations in pneumonia to have a special room fitted up in the New York Babies' Hospital for giving medicine in this manner.

There is no doubt about the value of inhalations and it is a wonder that more physicians do not use them by the common croup kettle and umbrella methods, mentioned in Holt's book.

C. G. Kerly, of New York, advises 10 drops of creosote to a quart of water. This is the prescription generally used in the New York Babies' Hospital.

In conclusion: It is the strength and vitality of a sick child that saves it, and not the medicine. Consequently, the main idea is to conserve the strength of the little patient—no matter whether the disease is broncho pneumonia or lobar pneumonia, whether it is infectious or not infectious.

DISCUSSION ON LOREN CURTISS' PAPER.

W. G. Ferguson, Sturgis: I was well pleased with the doctor's paper. It was practical and to the point. I might add, however, a few additional points in regard to the conditions prior to the treatment. If I had a child with pneumonia, I would like to select a south room. I would like to select a room with plenty of sunlight. Sunlight affects children as it does plants. It is a stimulant; good, bright sunlight. Have the patient so arranged that it will have as much sunlight as possible.

The doctor said nothing in regard to the temperature of the room. I like to keep the temperature somewhere about 68°, keep it uniform, from the incipient stage throughout the whole course of the disease.

I believe the doctor said nothing concerning the diet of the child. I think this should be looked after also. The child should have food that will assimilate well, and not be a detriment to its digestion. The child should be attended by a well trained nurse, or the mother should be instructed in the correct manner of feeding the child. I think that all fussing and company should be prohibited. Put a placard on the door—"No admittance here except attendants." Keep the patient quiet. The child needs that. It is a factor in its progress.

I am inclined to agree with the doctor in regard to poultices. I have had some experience in regard to that matter. We all know that it is claimed by some to be a great factor in the assistance of the evaporation of the body. However, this has not been my experience.

Another thing that I have realized with pneumonia is this—give as little medicine as you can possibly get along with. I do not give one-third of the medicine that I did thirty years ago. Then I thought it was the drugs that cured children; today I believe it is proper care and diet. Close watchfulness on the part of the mother or the nurse will achieve more in nine cases out of ten than drugs. Assist nature's law and she will be the best servant that you can get. I have had better results from hydrotherapeutics than I have had with drugs. My plan is to have my patients sponged once a day, having this done under cover, putting a little alkali in the water. Great relief follows the sponging.

B. R. Shurly, Detroit: The problem of pneumonia in children is one of the most

timely subjects the general practitioner can consider. The more we consider it the more we find that a certain number of prominent, cardinal points in the pathology and the therapy of this disease in children are becoming more prominent in our minds.

The infection of the respiratory tract as a purely pneumonic infection with the various affections attending it, offers special problems of treatment in each case. Attention should be directed along the line of supporting on hygienic treatment with the use of creosote and the salicylates. We know in hospital treatment how fatal these cases are. The disease should be classified, not only as an infectious disease, but very frequently as a contagious disease, in hospital treatment.

In our foundling homes and institutions, pneumonia epidemics are attended by the most fatal complications which we have to meet. As a secondary infection we have epidemics of measles and diphtheria, especially.

The question of the development of this disease is very prominently associated with the development of some abnormality in the lymphoid ring. How frequently we meet with the presence of enlarged tonsils and enlarged bronchial glands in these cases, is certainly familiar to you all.

The pneumonic grunt which has been prominently brought out in this paper, is a symptom that can well be considered as patho-pneumonic, and as a very prominent one. However, a number of these cases will develop the so-called pneumonic grunt when we have an infection of simply the larynx and the bronchial tubes, bringing about a very diminished supply of oxygen; so that while the doctor's theory is undoubtedly a very ingenious one it seems to me that there are conditions which are not true pneumonia, but conditions where the bronchial tubes are simply overloaded with the secretion, which will develop this symptom.

The question of deep consolidation is a very important one in connection with the early diagnosis of this disease, but many of these cases will go along for some days without a diagnosis, unless we are very careful about examining with a stethoscope. So that very minute areas are frequently infected and consolidated before we are able from the clinical symptoms to determine the presence of a true pneumonia. We can frequently suspect pneumonia in these cases, for several days before the consolidation has reached the superficial areas sufficiently for diagnosis from physical examination.

The depression in connection with drugs deserves very important emphasis. I think that many of us do a great deal of harm in our treatment of pneumonia.

The question of fresh air is one which is most sadly neglected. The popular idea is to keep the child as closely confined to the room as possible; and the amount of oxygen which would be supplied to the case is very sadly deficient. The use of depressing drugs causes serious interference very frequently with these cases.

Again, the impairment of the stomach is one of the most frequent conditions which we meet with in the use of a considerable number of drugs. With the complicating condition, the stomach trouble, stomach disturbance, and nausea, we have the gravity of the cases very much increased.

The mortality in lobar pneumonia in children is only about four per cent.; and with proper care these cases will usually recover. The blood stasis is a condition which we should most certainly keep in mind, and the treatment should be along the lines of relieving that. As soon as we have the blood stasis relieved we have the condition clearing up much sooner.

The use of the croup tent is scarcely to be advised, for the simple reason that the use of the croup tent diminishes the supply of oxygen. It is only when the laryngeal condition is of the greater relative importance than lung or bronchial involvements that we should expect benefit from the use of the croup tent. The fact that this deprives the little patient of air, is certainly a detriment to its recovery.

C. H. Johnston, Grand Rapids: I did not hear all of this paper, so that some of the remarks I may make may be a little irrelevant. I came in when the essayist was talking on the subject of diagnosis, and I was pleased to hear him state that the visible signs of pneumonia in a child were apt to be very different from those in adults. Frequently one has to make a diagnosis of lobar pneumonia in a child from the symptoms alone. I have often failed to find bronchial breathing, dullness on precussion, bronchial voice, and vocal fremitus until after the crisis. I have frequently seen a child four or five or six or eight years old with disturbed pulse, respiration ratio, and an expiratory moan, coming on suddenly during perfect health, the temperature being from 102° to 104°, in whom I have made a diagnosis of pneumonia without finding any physical sign in the chest other than prolonged expiration. Possibly at the lower left lobe or the upper right there may be a few crepitant rales, but the typical signs of lobar pneumonia are often not found until for four or five days, or possibly not until the day after the

crisis. So that we are frequently called upon to make a diagnosis of lobar pneumonia without typical physical signs, or else have to treat a case undiagnosed until the child is almost convalescent. This of course refers simply to lobar pneumonia. Catarrhal pneumonia is usually secondary. The duration of the disease, the fluctuating temperature and the small areas of consolidation here and there, usually enable us to make an early diagnosis.

When you come to the treatment, I think the fewer drugs used the better. The only drugs I have used in pneumonia in children in several years are strychnia and nitroglycerine. Alcohol I don't use at all. I think alcohol does children and most adults with pneumonia more harm than good. The walls of the heart of a child are relatively three or four times thicker than those of an adult, and we have to pay more attention to the respiration than we do to the pulse. The respiration rate is increased relatively much more than the pulse rate. Instead of the normal respiration pulse ratio of one to four, we get a ratio of one to three or one to two. I have seen a respiration of 100, with a pulse of 150 or 160. So that it is the respiratory center we must stimulate in the child. Now we all know that strychnia is the best respiratory stimulant in the pharmacopia. So strychnia is one of the two drugs that I use in pneumonia in children.

I frequently begin the strychnia as soon as I have made my diagnosis, giving it in a dose sufficiently large to produce its physiological effect; then I keep it up. If the case is one of bronchial pneumonia, it is the best expectorant we have.

Poultices I laid aside a long time ago. I do believe in the use of mustard in the manner the essayist spoke of. I use it very much in the form of mustard pastes. I also frequently envelope the lung of a child with lobar pneumonia with ice bags. By the way, I think an ice bag over the heart is a much better cardiac stimulant than all the whisky you can feed a child.

In pneumonia in a child as well as in an adult, I pay fully as much attention to the abdomen as to the lung. I am always afraid of a case of pneumonia with a distended abdomen almost as much as after an abdominal operation.

I think the most important agent of relief in a case of pneumonia is the nourishment. So I let nothing interfere with the patient's nutrition and I never fear for a case of pneumonia with a good appetite. When tympanites begin, I administer a cathartic and use salol or some intestinal antiseptic. When the abdomen once becomes distended respiration is interfered with and the prognosis is rendered thereby much less favorable.

Loren Curtiss, Paw Paw: Dr. Ferguson has mentioned sixty-eight degrees as a desirable temperature for the room in which a child is sick with pneumonia. While I think it is a good idea to be very careful about the temperature, still, I hardly think it is necessary to be so explicit in directions as to its being sixty-eight. Nevertheless, it is sometimes necessary to emphasize rather minor points in order to get parents to carry out more important ones. It seems to me that we must individualize and no temperature can be advised as a routine procedure, other than one comfortable to the patient.

Dr. Shurly has spoken about the croup tent. I agree with him entirely, but, he said it was indicated only in those cases where there were laryngeal complications. As nearly every case of pneumonia in children is accompanied by more or less laryngeal involvement, the croup tent or medicated inhalations would be indicated in a majority of cases. I think the majority of cases occurring last winter were preceded by influenza and the larynx was always involved. At least, that is my experience.

While oxygen is all important, it seems to me that the improvement, from medicated inhalations, in the child's oxygenating capacity, in the clearing up of a lung already filled with mucus which it cannot expel, more than compensates for any more or less small loss of oxygen the child may experience while under a tent or in a steaming room such as Holt has devised for the New York Babies' Hospital.

Cancer of the Pancreas and Glycosuria (Conclusions).—We have a definite basis for ascribing a certain portion of the cases of diabetes to lesions of the pancreas and ultimately to lesions of the islands of Langerhans. I believe we can include the permanent diabetes of cancer of the pancreas in this group. Further observations must be made before intermittent glycosuria can be attributed to destruction of large numbers of islands. The absence of diabetes in cases of extensive involvement of the pancreas would appear to be due to the survival of small fragments of pancreas, including a number of islands sufficient to carry on their peculiar function. The persistence of the islands under adverse conditions described support the observations heretofore made concerning their anatomical independence, while their enlargement, suggesting as it does a compensatory hypertrophy, is corroborative of the theory that they have an independent special function. (*The American Journal of Medical Sciences,* Sept., 1904, R. M. PEARCE.)

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Editorial

HAVE WE FOUND THE ETIOLOGY OF PERNICIOUS ANÆMIA?

Recently some interesting experimental work has been done by Charlton[1] on the possible cause of pernicious anæmia. If his work should stand the test of time we have gone a long way toward finding out about this obscure, and at the same time fatal disease. In a study of subinfection made about a year ago he found that he got by intravenous injection of living cultures of colon bacilli a peculiar anæmia accompanied by spinal cord degeneration causing symptoms similar to the neuritis of pernicious anæmia. This anæmia disappeared when the injections of the living cultures were discontinued, but promptly reappeared when the injections were resumed. If the injections were continued, the degeneration progressed until paraplegia ensued. He was unable to get the extreme degrees of anæmia that are at times found in pernicious anæmia. He did, however, obtain a reduction to twenty-five per cent. of the normal number of red blood corpuscles and to ten per cent. of the hæmoglobin. Relatively few changes except in the blood and nervous system were found at the necropsies. More recently[2] he has done further work on the subject and particularly on the effects produced by (a) killed cultures of the colon bacillus (b) filtered cultures (c) by action of pepsin and hydrochloric acid on living cultures. It was found that the living cultures were the only ones that seemed to have much action on the system in causing the anæmia, and that the presence of pepsin and the acid had practically no effect if the living cultures were used.

Many observers have maintained that pernicious anæmia was due to the absorption of either bacteria or of the products of bacterial growth from the intestinal canal. Vaughan[3] has also shown that the toxine of the colon bacillus stays intracellular and is not free in the culture medium. Charlton, it will be seen, finds that the living cultures were the most active in producing the anæmia. It would, therefore, rather point toward the fact that if the colon bacillus was the cause of the pernicious anæmia it was the result of gradual absorption. Hence the study of chronic infection or subinfection, of the colon bacillus should bring us more extended knowledge of this curious condition which has so long baffled the clinician and the laboratory worker. As a deduction from this study of the action on the colon bacillus are we not helped to account for the marked anæmia which we at times find in the so-called septic cases of the puerperal period which on bacterial examination are found to be due to the colon infection rather than to the streptococcic group of micro-organisms? It will be remembered that most of these follow lacerations of the vagina where colon bacilli could easily be gradually absorbed. The anæmia clears up rapidly when the lesions heal.

HARRISON D. JENKS.

1. G. A. Charlton. A Study in Subinfection, *Jour. Med. Research*, viii, No. 2, 1903.

2. G. A. Charlton. A Study of Chronic Infection, *Jour. Med. Research*, xi, No. 2, 1904.

3. Vaughan, V. C. A Study of the Bacterial Cell. *Trans. of Assoc. Amer. Phys.*, vol. xvii, 1902.

IS THE BACTERIAL CELL ESSENTIALLY A CHEMICAL COMPOUND OF DEFINITE AND CONSTANT COMPOSITION?

During the past year Vaughan and Wheeler have done some very interesting work in regard to the bacterial cell. They found that sodium alcoholate, acting on the germ substance of the colon, typhoid and anthrax bacilli, split off, in soluble form, highly poisonous groups. The alcoholic solution of the colon bacillus contains two groups of bodies, one poisonous and one non-poisonous (at least not actively so). The toxin is precipitated from the alcoholic solution by platinum chloride, leaving the non-toxic body in solution. This toxin Vaughan and Wheeler consider the specific toxin of the colon bacillus. As to the nature of the toxic body, it is probable that it is composed of a haptophore and a toxophore group. There are certain reasons (chemical and physiological) for considering the toxophore group a neurin.

Only about 1/3 of the bacterial cell goes into solution when heated with sodium alcoholate. The part of the cell substance, insoluable in alcohol, is soluable in water (wholly on addition of traces of acid). This latter substance is not poisonous. The aqueous solution contains a hemolysin and a group that splits up the hemoglobin into hematin and a globulin. The hemolysin is precipitated from the aqueous solution by the addition of an acid and the application of heat.

It was found that the colon toxin immunizes guinea pigs against both itself and the living germ.

The conclusions that are reached by Vaughan* are as follows:

1. The colon bacillus in its essential part is a chemical compound as truly as sodium sulphate or phenylhydrazin.

2. The colon bacillus is a chemical compound, in whose molecule we have demonstrated the existence of the following groups: Nuclein, amido, diamido, monoamido, carbohydrate, toxic, hemolytic, and hemoglobin splitting.

3. Every cell in the animal body contains complex molecules similar to those of the bacillus.

4. The reaction of the colon molecule and a body molecule or cell is chemical, just as much so as that between sulphuric acid and calcium carbonate. When these two molecules are brought within the range of chemical attraction, if the chemism between a group in the one and a group in the other is greater than that which holds these groups in their respective molecules, a reaction takes place. Each group is split off from its molecular combination, and the two combine to form a new molecule. The injury done the bacillus or the cell depends on the group that has been abstracted. No bacillus molecule can do the body cell harm unless such a reaction takes place. It also follows that a toxin split off from a bacterial molecule and injected in the free state into an animal does harm, or breaks down the body molecules more promptly than when the unbroken bacillus is introduced, as sodium chlorid is not a poison, but if it be broken up into its constituent base and acid, either of these, when introduced into the body, destroys the first cells with which it comes in con-

*_The Journal of the American Medical Association,_ Sept. 3, 1904.

tact. This is, I think, nicely illustrated with our colon toxin. The living culture or the dead germ substance, when placed in the abdominal cavity of a guinea-pig, requires from ten to twenty-four hours to kill, because the colon molecule must be split up before the toxic group becomes active, but when the free toxic group is employed, it may kill within as many minutes, because it is ready to combine with groups in the cell instantly on coming within range of their chemism. Moreover, when the free toxin or toxic group is thrown into the abdominal cavity, it requires a longer time to kill than when injected intravenously because, in either case, it reacts with the cells with which it first comes in contact, and with which it is capable of combining. When injected intravenously, some part of the free toxic group comes in contact with the cells of the respiratory center, and death, or at least arrest of the respiratory movements, is almost instantaneous.

5. If this conception of the reaction between bacillus and cell be true, the formation of antitoxins is capable of an explanation, which seems to me simpler than any yet proposed. Suppose that the chemical attraction between the toxic group of the bacterial cell and a group styled "M" in the cell molecule is greater than that which holds these groups in their respective molecules. Then these groups will be broken away from their molecules and unite to form a new molecule, which, being saturated and sloth, is not harmful. The injury done to the cell will depend on the importance that the group "M" bears to the functioning powder of the cell and the injury done to the animal depends on the number of cells whose physiologic function is thus interrupted. A true toxin—understanding this term to apply only to those agents which are capable of producing antibodies in the animal organism—does not completely destroy cells. It injures animal cells but leaves them in such a condition that they can repair themselves. No other explanation is at present possible because the formation of the anti-body is dependent on this process of repair. An agent that destroys the body cells of the animal is a poison but not a toxin. It is possible that a cell toxin leaves the nuclein group of the cell intact, while the cell poison breaks up this group and consequently permanently destroys the cell and renders formation of an anti-body impossible.

AUTOINTOXICATION.

In the normal state there is an enormous quantity of microbes in the digestive tract. Vegetable alkaloids are formed in the intestine where they are absorbed. They reach the blood stream and are thus finally eliminated in the urine. Intestinal digestion is a complex function. Starch is converted into sugar, fats are emulsified, and albumens are converted into peptones by enzymes and intestinal microbes. These latter agents have, however, the further function of fermenting the carbohydrates producing sulfureted hydrogen, other gases, lactic acid, etc. These same intestinal microbes also act on albuminous material forming ptomains; normally the organism is defended against these various poisons:

1. By the intestinal epithelium.

2. By the liver which stops and neutralizes those poisons which have passed through the intestinal epithelium.

3. By the kidneys and other organs of elimination.

4. By thymus and thyroid glands and suprarenal bodies which produce antitoxic action against the poisons arising in the intestinal canal.

THE ZITTMANN TREATMENT OF MALIGNANT SYPHILIS.

This line of treatment is adapted for those cases in which mercury and the iodides do no good, where the disease runs a rapid course and terrible destruction of tissue occurs. It is in this class of cases that the Zittmann treatment works best. The principle on which the treatment is based is the expulsion of the syphilitic poison by diaphoresis and purgation. It is stated that in many cases where destruction to the tissue has been great, the disease has been arrested by a fortnights treatment.

The evening before the treatment is begun the patient receives calomel, grains 2, compound extract of colocynth, grains 5 and extract of hyoscyamus, grains 2. On the morning after the above dose has been taken the patient drinks half a pint of hot decoction No. 1*, at 9, 10, 11, and 12; and in the evening he drinks a half a pint of cold decoction No. 2† at 3, 4, 5, and 6. He is kept in bed except that he is allowed to sit up for one hour in the evening. This process is repeated for four days. The patient takes a hot bath on the fifth day and gets up. On the evening of the fifth day some more calomel, colocynth and hyoscyamus are taken and the following day the treatment is resumed. This course of treatment is followed for 15 days.

*This decoction consists of sarsaparilla root oz. 4, anise seed and fennel seed each grs. 500, senna leaves oz. 1, and licorice root oz. 4. These bruised and added to gallons 4 of water, together with grs. 80 each of white sugar, alum sulphate and calomel, and grs. 20 of the red sulphide of mercury enclosed in a linen bag; the water is then boiled down gently to one gallon.

†Take the dregs of the above and put them into 3 gallons of water, with 2 oz. of sarsaparilla root and 1 oz. each of lemon peel, cardamon seed, and licorice root, and boil down to one gallon.

REMOVAL OF DR. WILLIAM OSLER TO OXFORD, ENGLAND.

Dr. Osler has accepted a call to the University of Oxford, to fill the chair just relinquished by Dr. Burdon Sanderson. All his life he has been a teacher, at Montreal; then the University of Pennsylvania, and lastly at Johns Hopkins University. How well he has taught is answered by the thousands of his students, occupying positions of honor and trust in the profession; by the practice he has given the profession; by his writings and his public addresses.

We do not recall any epoch-making discoveries from Osler; but we find that every part of medicine has felt the touch of his analytical power over isolated observations and his sound judgment. If he has not made the dry bones live, he has filled the student with something of his own enthusiasm, and severed his career from the blight of routinism.

Gifted as few with vivid imagination and creative force in speech, his public addresses have changed the life currents of not a few to higher medical thinking and sounder practice.

As a "mixer" of the profession he has had few if any equals—all this on his own terms—thus rendering an inestimable service to medicine—as no need is greater than a co-operation of the profession, possible only as individuals are induced to join hands with neighbors near and far. Few brought to all the same cordial welcome, left as kindly remembrance as he passed by.

In common with the universal profession we regret that England has greater attractions for Dr. Osler than America; Oxford than Johns Hopkins, and hope his and England's gain may exceed our loss.

County Society News.

The management of the Journal desires to make the department on County Society News of the greatest possible interest to all practitioners in the State. This can only be accomplished through the assistance of the Secretaries of the various County Societies. It is therefore requested of them that, whenever possible, they send an abstract of the papers read before their Society and the discussions aroused by them. If for any reason this abstracting on the part of the County Society Secretary is impossible, it is requested that the papers be sent to the editor's office where they will be abstracted and returned to the writer. Anything which will be of interest to all in the way of items concerning members, resolutions introduced, etc., will gladly be received. It is only by the persistent cooperation on the part of the County Society Secretaries that this department can reach its greatest usefulness.

Miscellaneous.

NEWS ITEMS.

The Newport Association for the Relief, Control, and Prevention of Tuberculosis was recently organized. The objects of the association are disinfection of houses and personal effects, district nursing, the dissemination of printed matter, the establishment of a sanitary camp and the provision of good food.

A drug clerk in St. Louis, Mo., has been held for murder in the fourth degree by the coroner's jury and the proprietor held on the same charge on account of the death of a woman who sent to purchase cream of tartar and was given tartar emetic, labeled cream of tartar. The woman took a teaspoonful and died before physicians could counteract the effect. At the inquest it developed that the clerk was an unlicensed druggist.

Wiart has devised an electro-thermic sterilizer which does not rust instruments, is portable, cheap, and is arranged with a partition so that compresses, etc., may be boiled simultaneously. Gas or alcohol may be used when the electric current is not obtainable.

William H. Welch, Professor of Pathology at Johns Hopkins University, delivered the Lane course of ten lectures on "Infection and Immunity" before the faculty and students of Cooper Medical College and the invited guests, in the five days beginning August 15.

Muskegon County Medical Society has been granted a chapter by the Council of M. S. M. S.

Millions have been spent during the last few years in the building of a large modern hospital at Rome, Italy. Medical visitors to this city have all commented on the vast scale and splendid appointments of this new institution, with its spacious surroundings, apart from the heart of the city. It was formally opened on August 4th and 500 patients from the various other hospitals in Rome were transferred to the completed wards. Three of the pavilions are devoted to surgery, seven to general medicine and one to contagious diseases. There are 80 beds in each pavilion. In one of the surgical amphitheaters the operating is done in a glass compartment.

Menshikoff has recently given out a preliminary report of certain experiments which led him to conclude that measles may possibly be caused by a micro-organism resembling the pneumococcus, but distinguished from the latter by its virulence. He states that only one micro-organism is found in all cases of measles, a short diplostreptococcus. While there is not sufficient proof as yet to assert that this germ is the cause of measles, yet it is a constant accompaniment of the disease.

The chair of surgery left vacant by König's retirement after the completion of the model surgical clinic under his supervision, was offered to Professor Von Eiselsberg, of Vienna, with a tempting salary. He does not care to leave Vienna and so has declined the offer.

During the past month another State Medical Society Journal made its appearance, namely The Journal of the Medical Society of New Jersey.

CHANGE IN MEMBERSHIP.

(August 15th to September 15th.)

NEW MEMBERS.

S. Bloch, Muskegon, Mich.
J. A. Fleming, Muskegon, Mich.
F. W. Garber, Muskegon, Mich.
G. Hartman, Muskegon, Mich.
D. Hatt, East Tawas, Mich.
L. W. Keyes, Whitehall, Mich.

C. S. Layton, Blaney, Mich.
J. Oosting, Muskegon, Mich.
E. L. Niskern, Muskegon, Mich.
P. A. Quick, Muskegon, Mich.
A. A. Smith, Muskegon, Mich.
C. T. Smith, Whitehall, Mich.
B. A. Stevenson, Traverse City, Mich.
P. J. Sullivan, Muskegon, Mich.
O. C. Wicks, Muskegon, Mich.
L. N. Yerkes, Garden, Mich.

CHANGE OF ADDRESS.

T. S. Burr, South Bend, Ind.
G. W. Lawton, Ann Arbor, Mich.
R. L. Morse, Norwalk, Ohio.
F. H. Newberry, Oshkosh, Wis.
P. J. Noer, Waberis, Wis.
C. Oswald-Dedrick, DeLand, Fla.
A. E. West, Woodbury, N. J.

BOOKS RECEIVED.

A PRACTICAL TREATISE ON GENITO-URINARY AND VENEREAL DISEASES AND SYPHILIS. By Robert W. Taylor, M. D. Lea Brothers & Co., Philadelphia and New York. 1904.

A TEXT-BOOK OF PHYSIOLOGICAL CHEMISTRY FOR STUDENTS OF MEDICINE AND PHYSICIANS. Second Edition. Revised and Enlarged. By Charles E. Simon, M. D. Lea Brothers Co., Philadelphia and New York. 1904.

A TEXT-BOOK OF THE DISEASES OF WOMEN. By Charles B. Penrose, M. D., Ph. D. Fifth Edition. W. B. Saunders & Co., Philadelphia, New York, London. 1904.

A TEXT-BOOK OF MATERIA MEDICA. By R. A. Hatcher, Ph. G., M. D., and T. Sollmann, M. D. W. B. Saunders & Co., Philadelphia, New York, London. 1904.

A HAND-BOOK OF SURGERY. By Frederic R. Griffith, M. D. W. B. Saunders & Co., Philadelphia, New York, London. 1904.

Transactions of the Medical Society of the State of New York. 1904.

Transactions of the Florida Medical Association. 1903-1904.

Transactions of Tennessee State Medical Association. 1904.

Thirtieth Annual Report of the Secretary of the State Board of Health of the State of Michigan for the fiscal year ending June 30, 1902.

Correspondence.

To the Editor of Journal of the Michigan State Medical Society.

DEAR SIR:

The American Medical Society for the Study of Alcohol and Other Narcotics was organized June 8, 1904, by the union of the American Association for the Study of Inebrity and the Medical Temperance Association. Both of these societies are composed of physicians interested in the study and treatment of inebrity and the physiological nature and action of alcohol and narcotics in health and disease. The first society was organized in 1870 and has published five volumes of transactions and twenty-seven yearly volumes of the Quarterly Journal of Inebrity, the organ of its association. The second society began in 1891 and has issued three volumes of transactions and for seven years published a Quarterly Bulletin containing the papers read at its meetings. The special object of the union of the two societies is to create greater interest among physicians to study one of the greatest evils of modern times. Its plan of work is to encourage and promote more exact scientific studies of the nature and effects of alcohol in health and disease, particularly of its etiological, physiological and therapeutic relations. Second, to secure more accurate investigations of the diseases associated or following from the use of alcohol and narcotics. Third, to correct the present empirical treatment of these diseases by secret drugs and so-called specifics and to secure legislation prohibiting the sale of nostrums claiming to be absolute cures containing dangerous poisons. Fourth, to encourage special legislation for the care, control and medical treatment of spirit and drug takers. The alcoholic problem and the diseases which center and spring from it are becoming more prominent, and its medical and hygienic importance have assumed such proportions that physicians everywhere are called on for advice and counsel. Public sentiment is turning to medical men for authoritative facts and conclusions to enable them to realize the causes, means of prevention and cure of this evil. This new society comes to meet this want by enlisting medical men as members and stimulating new studies and researches from a broader and more scientific point of view. As a medical and hygienic topic the alcoholic problem has an intense personal interest, not only to every physician, but to the public generally in every town and city in the country. This interest demands concentrated efforts through the medium of a society to clear away the present confusion, educate public sentiment, and make medical men the final authority in the consideration of the remedial measures for cure and prevention. For this purpose a most urgent appeal is made to all physicians to assist in making this society the medium and authority for the scientific study of the subject. The secretary, Dr. T. D. Crothers, of Hartford, Conn., will be pleased to give any further information.

Secretary:

We have the honor to report to you that at a meeting of the Department of Public Instruction, held August 26, 1904, the resolution submitted by the committee appointed by the State Medical Society at its last meeting to encourage the examination of the eyes and ears of the school children throughout the state was adopted.

The same resolution will be presented to the State Board of Health and an early action is anticipated.

Respectfully yours,
WALTER R. PARKER, M. D.,
Chairman.
CHARLES G. BAKER, M. D.,
JOHN R. ROGERS, M. D.,
Committee.

Detroit, Aug. 29, 1904.

Book Notices.

Under the charge of
RAY CONNOR.

THE PRACTICAL APPLICATION OF THE RÖNTGEN RAYS IN THERAPEUTICS AND DIAGNOSIS. By William Allen Pusey, A. M., M. D., and Eugene W. Caldwell, B. S. Second edition, thoroughly revised and enlarged. Handsome octavo volume of 690 pages, with 195 illustrations, including four colored plates. Philadelphia, New York, London: W. B. Saunders & Co., 1904. Cloth, $5.00 net; Sheep or Half Morocco, $6.00 net.

Now that the glamor surrounding the extravagant claims made by enthusiasts in the use of the Röntgen Rays has subsided, it is fortunate that Pusey and Caldwell have been able to put a new edition of their work upon the market.

Naturally during the year there has been much improvement in technique and it is to be regretted that Caldwell has not seen fit to bring his excellent treatise of Part I on X-Ray Apparatus and Its Use in Diagnosis up-to-date. It is especially by these new and more precise methods of technique that we are enabled to interpret the details of the radiographic image with greater precision; and as this interpretation becomes more exact it becomes more valuable as an aid to diagnosis. There has not been, as far as we have observed, one material word changed or added to Part I.

Pusey, however, in Part II on the Therapeutic Application of X-Rays has very materially enlarged the work. Much has been written during the year and he has carefully reviewed this literature, giving the resumé, and what is more interesting and practical, has brought down to this year the history of his own cases with a frankness which renders his conclusions most trustworthy. He states that the study of this vast amount of literature and his own extensive experience has not led him "to change in any important particular either the therapeutic indications for the application of X-Rays, or the general conclusions as to their field of usefulness."

In the first chapter, on the effects of X-Rays on the tissues, he devotes a few extra paragraphs on the after-effects on the skin; on the extensiveness of burns involving the subcutaneous tissue, and to the long duration of X-Ray effects.

In the indications for the therapeutic uses of the X-Rays a few more of the rarer diseases have been added to the list of possible amelioration, as gathered from reported cases.

Pusey still believes that in the treatment of acne this form of medication is the most useful; but he advises very weak exposures, which reduce to a minimum the dangers of a burn.

Reporters have noted especially favorable results in hyperidrosis and seborrhœa, in eczema, psoriasis, lupus, erythematosus and lupus vulgaris, etc.; and much improvement in the treatment of the tuberculous cervical gland, tuberculous sinuses and tuberculous lesions of other portions of the body.

It is particularly with the cases of cutaneous carcinoma that so much has been expected; and so the chapter on this subject, with the detailed report of cases, is most interesting. A more extensive experience has not only not altered Pusey's views, but has made his opinion more emphatic.

It is these details regarding the use and management of the various apparatuses; the many illustrations of clinical cases; the authors' extensive and well recognized views of the practical application of the Röentgen Rays in disease, which stamp the work as authoritative, practical and finished.—A. P. B.

A TEXT-BOOK OF PATHOLOGY. By Joseph McFarland, M. D. Octavo volume 818 pages, with 350 illustrations, a number in colors. Cloth, $5.00 net; Sheep and Half Morocco, $6.00 net. Philadelphia, New York and London. W. B. Saunders & Co., 1904.

The difficulty in writing a thoroughly satisfactory Pathology can hardly be over-estimated. The subject is one so large that a life time of study is too brief to cover it all and to condense this into a book of a few hundred pages is quite impossible. The question becomes rather one of what shall be omitted than what shall be put in, and this largely depends on the audience for which the book is intended. The work before us is primarily for the student of medicine and the points likely to be of value to him are those chiefly dwelt upon, while those of purely theoretical interest are less fully discussed.

Under General Pathology, the first part of the book, are discussed such topics as the etiology of disease, pathology of nutrition, parasitism, immunity and infection and infectious diseases. The consideration of diseases of the cardio-vascular, respiratory, reproductive systems, etc., comes under the second part of the work, Special Pathology. In order to make the volume as compact as possible, the less important material

is put in fine print. The illustrations are very numerous and drawn from many well known standard works. They are much above the average in excellence and are especially strong on the clinic side of pathology.

The pathology of the nervous system is not given quite so much room as in many text-books and much that is given is put in the smaller type. The index at the close of the book is very full and complete and adds greatly to the value of the work.

A SYSTEM OF PRACTICAL SURGERY. By Prof. E. von Bergmann, of Berlin; Prof. P. von Bruns, of Tubingen, and Prof. J. von Mikulicz, of Breslau. Edited by Dr. William T. Bull. To be complete in five imperial octavo volumes, containing 4,000 pages, 1,600 engravings and 110 full page plates in colors and monachrome. Sold by subscription only. Per volume, cloth, $6.00; Leather, $7.00; Half Morocco, $8.50. Volume IV just ready. 757 pages, 345 engravings, 16 pages. Lea Brothers & Co., Philadelphia and New York, 1904.

The fourth volume of this system is given up to that most important and modern of all the branches of surgery, namely that of the alimentary tract. The list of contributors to this volume is made up almost exclusively of professors and their efforts supplemented by those of the American editors have succeeded in bringing out a very valuable and comprehensive work.

In the section on the œsophagus, Prof. v. Hacker gives an excellent description of œsophagoscopy, its technic and uses. A plate of colored sketches serves to illustrate the pictures that are obtained in the studies of œsophageal cancers. It is comforting, however, for the general practitioner to bear in mind that even when found these growths have as yet proved entirely inoperable. The section on the surgery of the stomach and intestines is by Prof. v. Mikulicz himself. Appendicitis is treated at some length and the various forms of intestinal anastomosis described.

Prominent amongst these is the Murphy button which is fully described and illustrated. It is even used by the Germans themselves when time is a great object and is the only mechanical aid which has as yet received very widespread adoption.

A section is devoted to hernia and another to the liver and biliary passages. Two brief sections on the spleen and pancreas complete the volume, which is one of the best yet published in the series.

The illustrations, while not quite so numerous as in some of the preceding volumes, are very excellent and add much to the value of the book. The text is rendered in the same clear idiomatic English as in the preceding volumes and the proof reading seems on the whole to be well done despite a few slips which have escaped attention. An index closes this volume as in the foregoing ones and adds to the usefulness of the work for reference.

THE CLINICAL TREATISES IN THE PATHOLOGY AND THERAPY OF DISORDERS OF METABOLISM AND NUTRITION. By Prof. Dr. Carl von Noorden. Translated under the direction of Boardman Reed, M. D. Part II. Nephritis. Small 8 vo., 112 pages. Cloth, $1.00. E. B. Treat & Co., New York, 1904.

The rational treatment of chronic diseases present often many perplexing and troublesome points. It is therefore with gratitude that one turns to any source of light available. Perhaps no one is better qualified to speak with authority on the treatment of nephritis than Prof. von Noorden, as so much of his time has been given up to the study of the problems involved. He has departed from the traditional methods of treating nephritis in certain important respects and always with a reason for the faith that is in him.

The customary methods of treatment are first considered and then the facts and principles which underlie the therapy of first the acute and then the chronic forms. As is pointed out, too much stress can easily be laid on the amount of albumen excreted in the urine. The general condition of the patient must be taken into consideration, as it often happens that while the albumen is increasing slightly, the general health of the patient is also improving steadily, and there exists no call for a gloomy prognosis.

This little book is very practical and exceedingly stimulating in its thought. The translator has succeeded in putting it into clear idiomatic and readable English. The proof reading is not as well done as one could wish, but the work as a whole very well repays the time and trouble of a perusal.

CLINICAL TREATISES ON THE PATHOLOGY AND THERAPY OF DISORDERS OF METALBOLISM AND NUTRITION. By Prof. Dr. Carl von Noorden. Translated under the direction of Boardman Reed, M. D. Part III. Colitis. Small 8 vo., 64 pages. Cloth, 50 cents. E. B. Treat & Co., New York, 1904.

In this little essay the author takes up membranous catarrh of the intestines or colica mucosa and considers first the pathology, and then the treatment. This, by no means rare disease, while almost always associated with both constipation and neurasthenia, has still another element in its causation which von Noorden well calls a secretory neurosis. The various views of other prominent clinicians are gone into rather fully, as on the view taken of the pathology rests very largely the subsequent therapy.

The method of treatment employed in this class of cases has as its main object the promoting of the normal functioning of the intestinal tract and the means to this end are laid down clearly, definitely and in a thoroughly practical form. The striking feature of the treatment here as in nephritis is that drugs are conspicuous by their absence. The results that have been obtained by the application of the principles given are very striking indeed for such a troublesome disorder. Only about 5 per cent. of complete failures have to be reported.

Progress of Medical Science.

MEDICINE.

Under the charge of

HARRISON D. JENKS.

Bacteriuria.—This is defined by Krogius as "characterized, on the one hand, by the presence of a great number of microbes in the urine freshly passed, and on the other hand by the absence of pronounced symptoms indicating an inflammatory process of the urinary organs." This second part means absence of pus in the urine. While this condition was first described in 1881 by Roberts, who noted an acid urine with strong disagreeable odor comparable to dead fish, little was done further on it until 1891. Sixty-seven cases have been carefully observed, of which 56 gave the colon bacillus as the cause, seven had staphylococci, and it is also known that in typhoid there are 20 to 30 per cent. affected with bacteriuria; the colon and typhoid infections are both of renal origin.

The mere presence of virulent bacteria in the urinary organs, whether made experimentally or transmitted by the kidney in the course of a typhoid fever or mingled with the pus of cystitis is not enough to cause bacteriuria. It is necessary to have a parietal lesion to cause the trouble. This parietal lesion may be in the prostate or seminal vesicles, or in the pelvis of the kidney. Of the latter, typhoid bacteriuria, when there is an acute catarrhal pyelitis, is important, for proper treatment will prevent a beginning of a chronic interstitial trouble. Puerperal bacteriuria is important, but has been entirely neglected. It is probably common, due to the colon bacillus. Here again proper recognition is essential for the prevention of chronic affection of the kidney. Again, in chonic catarrhal pyelo-nephritis b cteriuria is a common trouble.

The treatment is simple and in the typhoid and puerperal cases rapid and complete; urotopan, 2, 4, 6, 8, tablets a day and diluent water.

It will be seen that bacteriuria is a symtom, not a disease. Yet it is the only striking feature of certain diseases, especially catarrhal pyelitis, either typhoid, puerperal, or acid retention. Cystitis never causes bacteriuria.—(*The New York Medical Journal*, August 27, 1904. E. L. KEYES, JR.)

The Adams-Stokes Symptom Complex.—In 1893 Huchard proposed the name Adams-Stokes disease for a remarkable symptom-complex characterized by temporary or permanent bradycardia, loss of consciousness, together with apoplectic or epilectiform seizures. According to him, the condition is usually if not exclusively encountered in individuals of advanced years and is indicative of arteriosclerosis of the cardiobulbar type.

The following general conclusions are drawn from the experimental data obtained:

1. The blood pressure is constantly very high, ranging from 170 to 250 mm.

2. The great arterial trunks of the extremities are fairly elastic.

3. Although very high blood pressure has existed for at least a year, the urine is normal in volume and specific gravity; there is little evidence of diffuse interstitial nephritis or of left ventricular hypertrophy.

From this it follows that the high pressure is well borne by the heart and kidneys.

4. Acute exercise, as a rule, has no accelerating action on the pulse. I have never counted an increase greater than two waves per minute. On the other hand, it occasionally exaggerates the bradycardia.

5. Exercise invariably causes a sharp rise of pressure.

It seems difficult to harmonize such contradictory findings with the prevailing theory of the circulation. There is a manifest disparity between the laggard work of the heart and the tremendous pressure at the periphery. This appears to be too great to permit of explanation by a theory which assigns to the left ventricle almost the entire work of overcoming the inertia of the blood column. Today there is reason to believe that the arterial system and the capillary network of the periphery constitute a powerful secondary mechanism in constant rhythmic activity. Such an assumption assumes that other portions of the blood vascular system besides the heart wall, contribute a large quota of the driving energy. Hasebroek in 1903 attempted to establish a new theory of the circulation, which gives this secondary apparatus (arterial system and the vast capillary network of the periphery) a more definite value. It is my belief that the so-called Adams-Stokes phenomena are highly suggestive of the existence of such an auxiliary mechanism dominated by the vasomotor system.—(*The American Journal of the Medical Sciences*, September, 1904. CLARENCE QUINAN.)

SURGERY

Under the charge of

MAX BALLIN.

Surgery of the Diaphragm.—A man 30 years old was stabbed in the left side, collapse and hemoptosis followed. Three hours after the accident, the left pleural cavity was opened freely, by enlarging the stab-wound along the sixth rib. The lung was found collapsed. The fundus of the stomach was prolapsed, through a rent in the diaphragm, into the pleural cavity. The stab-wound had penetrated the prolapsed part of the stomach for a length of two inches, and stomach contents had escaped into the pleural cavity. The wound in the stomach was closed by a double row of Lembert sutures, the pleural cavity was cleansed, the stomach was replaced, through the rent in the diaphragm, which proved to be one and one-half inches long, and the diaphragm was sutured by interrupted silk stitches. The peritoneal cavity was then opened, in order to ascertain the condition of the posterior wall of the stomach, but no other lesions were found.

The opened pleural cavity was drained. Bronchitis and empyema of the injured side made the recovery slow, but the patient finally got well.

From this case and a review of the literature on this subject, Neugebauer concludes that all diaphragmatic hernias should be sutured from the thoracal side. (*Archiv. fuer Klinische Chirurgie,* 1904, vol. 73, Part iv, F. NEUGEBAUER.)

The Significance of Acute Jaundice Following Surgical Operation.—E. H. King, of Muscatine, Iowa, reports three fatal cases of acute post-operative jaundice. The first occurred in a young man suffering from an appendicular abscess. Acute jaundice set in on the third day, coma and death on the sixth.

The second case was in a child, 4 years old, suffering from the same malady. Jaundice developed on the third day, coma, convulsions and death on the sixth day.

The third case occurred in a woman, 25 years old, operated on per vaginam, for a hematocele. Acute jaundice developed on the third day, coma and death the sixth day.

Personal inquiry of a few of our leading surgeons, and former publications, leads one to believe that this postoperative complication is of "occasional occurrence."

King does not think that chloroform by itself should be made responsible for acute jaundice following operation. His conclusions are:

(1) That post-operative jaundice occasionally occurs and is a symptom of grave import.

(2.) That it presents the clinical picture of acute yellow atrophy of the liver.

(3) That from the predominence of abdominal cases, traumatism to the peritoneum and interference with the portal circulation are the probable cause, and the anesthetic, possibly, is the inciting factor in producing this complication. (*American Journal of Surgery and Gynecology,* July, 1904, E. H. KING.)

Suture of the Brachial Artery.—A young man, 17 years old, had his left arm badly crushed between elbow and shoulder. Drainage of the lacerated wound was established. Seven days after the injury profuse hemorrhage occurred. The wound was opened and a funnel-shaped ulcer of the brachial artery was found. At every pulse beat, the blood stream was forced out through this hole; there was no radial pulse, the arm was cold and cyanotic. The hole in the artery was closed by one purse-string suture, which controlled the hemorrhage. A portion of the adjoining muscle was grafted over the sutured portion of the artery. The arm was kept on a right angle splint. The radial pulse returned in 5 hours. The patient is getting a complete use of the arm.—(*Annals of Surgery,* July, 1904, G. TORRANCE.)

To Increase the Resisting Powers of the Peritoneum.—As it is out of the question to specifically immunize because of the multiplicity of the causal agents, Mikulicz accomplishes his aim by inducing an artificial leucocytosis. It was found that nucleic acid was the most efficient agent for this purpose. It frequently produced a hyperleucocytosis of 25,000. The maximum is reached in man about 12 hours after the injection. It was tried in man in 34 instances. All the patients passed through the dangerous first week without any peritoneal complications. The operations included 7 resections of the stomach, 13 gastroenterostomies and other severe abdominal operations. He injects 50 c. c. of a 2 per cent. solution of neutralized yeast, nucleic acid injected subcutaneously in the chest wall. He urges the copious rinsing of the abdominal cavity with warm physiologic salt solution, as this tends to increase the number of leucocytes in the peritoneum besides its other advantages. (*Centralblatt. f. Chirurgie,* Leipsic.)

GYNECOLOGY AND OBSTETRICS.

Under the charge of

B. R. SCHENCK.

The Blood in Pregnancy.—From the time of Morgagni the constitution of the blood during pregnancy has been a subject of interest to many investigators and has given rise to a great deal of discussion, which unfortunately has not led to uniform conclusions, even in the hands of those working with modern methods.

Three views have prevailed as to the number of erythrocytes and amount of hemoglobin. (1) A diminution in the number of red blood cells and of the hemoglobin; (2) a decrease in the number of red blood cells and an increase in the amount of hemoglobin; (3) no change.

A leucocytosis has been uniformly observed, the maximum figure given being 16,500 per cu. m. m. Virchow referred the leucocytosis to the widening of the uterine and abdominal vessels and to the increase in metabolism in the uterus and its contents.

Most observers have noted a fall in the specific gravity.

Endeavoring to clear up some of the doubtful points, Thompson made monthly examinations of the blood of 12 pregnant women. This included the enumeration of the red blood cells, the estimation of the hemoglobin, the enumeration of the leucocytes, the differential count of the leucocytes and the determination of the specific gravity. The latter was estimated by the Hammerschlag method, using a mixture of benzol and chloroform.

From the study, Thompson reaches the following conclusions:

1. A moderate decrease is observed in red blood corpuscles rather early in pregnancy, remaining subnormal throughout the middle months, to rise again to normal at the termination of pregnancy—not, however, in all cases.

2. A low percentage of hemoglobin, constant throughout the first seven months, rapidly approaching normal as pregnancy draws to a close.

3. A slight absolute leucocytosis exists in every case of pregnancy, but this slight leucocytosis does not support the theory that it is due to any positive chemio taxis.

4. There is no variation from normal in the different forms of colorless corpuscles, the leucocytosis affecting all forms of white cells alike.

5. The specific gravity is high at the onset of pregnancy, diminishing by progressive steps, to reach its lowest level in the middle months, rising to normal at term. (*Johns Hopkins Bulletin,* June, 1904.)

The Prevention of Puerperal Sepsis in Private Practice.—Byers states that spontaneous delivery is very rarely followed by signs of puerperal infection, provided the patient has never been examined internally. Leopold has shown, in a series of 248 cases confined without internal palpation, that 98 per cent. had no fever whatever during the puerperium. But 5 cases showed any febrile symptoms and these were very slight.

During pregnancy, the uterus and vagina contain no pathogenic germs, though they are present on the inner wall of the labia in at least 60 per cent. of all cases. Internal examiation will necessarily carry these organisms upward where they may do great harm. Nurses and students should be early taught the dangers of internal examinations and the value and safety of replacing them by abdominal palpation.

We must recognize that in at least 75 per cent. of all cases, labor is a natural process, not to be interfered with. As stated by Edgar, labor is a conservative process, the tendency of which is to prevent sepsis. This tendency we should not thwart, nor should we supplant it with methods of our own. We should interfere only, when for some reason, the resources of nature prove inefficient.

The immediate repair of any laceration in the pelvic floor is very important in the prevention of puerperal sepsis. (*Lancet,* Aug. 13, 1904.)

Diphtheritic Vulvo-vaginitis.—Eriksson reports a comparatively rare and interesting case of diphtheria of the vulva and vagina in a child of eight years, whose sister had suffered from an attack of diphtheria a short time previously.

The first symptom was pain on urination, which subsequently became so severe that catheterization was necessary. The vulva was much swollen and inflamed and covered by a thin gray membrane. There was little discharge at any time. Later on in the illness a severe angina developed.

Klebs-Loeffler bacilli were grown from the exudate on blood serum. The patient made a good recovery after the use of anti-diphtheritic serum. (Rev. *Cent. f. Gyn.,* July 23, 1904.)

PHARMACOLOGY AND THERAPEUTICS

Under the charge of

W. J. WILSON, JR.

Treatment of Epidemic Cerebro-Spinal Meningitis.—To sustain life, we must feed the child. The gastric irritability and tendency to vomit can be overcome by rectal feeding of peptonized milk or peptonized yolk of egg. Lavage should be resorted to and light nutritious food such as whey, white of egg, broths, and soups should be given at regular 3 or 4 hour intervals.

Place the child in a room having a temperature of 68° to 70° if possible. If high fever is present, shave the scalp and apply an ice bag to the top of the head and at the nape of the neck. A mustard foot bath will in some cases relieve the cerebral symptoms. Tub baths (tepid) may be tried

The bowels and kidneys must be carefully watched. Retention of urine requires supervision. If the urine is scanty, we can stimulate its excretion by giving high colon flushings of normal saline solution at a temperature of 110°.

If stimulants are necessary the tincture of musk, or the hypodermic injection of camphorated oil are indicated. Hyoscyamine tablets of 1/100 grain are useful when active delirium is present. Suppositories containing 10 grains of chloralamid with or without small doses of belladonna are useful as sedatives and promote sleep. Large doses of potassium or sodium iodide, 1 to 4 gms. (15 to 60 grs.) or even more daily may be tried. Mercurial ointment rubbed into the scalp and nape of the neck morning and night was used in a case that recovered.

Corning recently devised an instrument for injecting medication into the spinal canal. The tube is to be inserted through an incision made along the side of the spinal process of the 4th lumbar vertebra. The tube is left permanently in place for days or weeks. Through this silver tube a fine needle attached to a glass syringe can be pushed through the membranes, dura and arachnoid. In this manner the subarachnoid space can be medicated.

Browning, of Brooklyn, reports a case in which an operation was performed at the occipital site. It was believed that more prolonged and effective drainage could be obtained by this method. Following surgical teachings, he drained off as much infectious material as possible. The reason for selecting this site is because it lies directly opposite the foramen of Majendie, which is the ventricular outlet. Here also there is less chance for return infection.

Brain surgery has not yet given anything but temporary relief. Our only hope lies in the discovery of an anti-meningococcic serum. (*N. Y. Med. Jour.*, Aug. 13, 1904, L. FISCHER.)

Treatment of Acute Alcoholism.—Upon the admission of a case all alcoholic stimulation is immediately withdrawn and eliminative measures instituted. When the presence of unabsorbed alcohol in the stomach is suspected, the tube is passed or apomorphine hydrochlorate (gr. 1/8) administered hypodermically. The latter has usually proven efficacious, and sedation has often been noted for a few hours afterward. Possibly the subsequent exhaustion is contributory to that end, although no deleterious effects have followed the use of this drug.

A course of calomel followed by salines is routine treatment when the stomach is retentive. Lavage usually insures relief in most cases of persistent vomiting; milk and lime water as a diet, with the occasional exhibition of cerium oxalate will do much toward establishing normal assimilation.

Mindful that all alcoholics are starved, or at least underfed, the institution of proper dietetic measures early is most desirable.

Highly concentrated liquid nourishment is given every two or three hours as the exigencies of the case may suggest. The addition of powdered capsicum to hot broths is especially useful. Chloral hydrate has proven a sovereign remedy in the treatment of these cases. As much as 40 grains have been given every 4 hours until the desired result is obtained. In cases manifesting cardiac asthenia, strychnine nitrate, atropine, aromatic spirits of ammonia, or infusion of digitalis are combined with this sedative. Morphine is used most cautiously, especially in the presence of renal complications. Hyoscine hydrobromate, although a much lauded remedy, has in my personal experience proven disappointing and unreliable. At times its use has been followed by great excitation of the nervous system, with subsequent great prostration. The practice of giving 20 to 30 grains of trional every four hours during the day with an evening dose of chloral hydrate, 20 to 30 grains, has given excellent results in many cases. (*Therapeutic Gazette*, Aug. 15, 1904, JOHNSON.)

DERMATOLOGY AND SYPHILIS.

Under the charge of

A. P. BIDDLE.

Affections of the Mucous Membranes in their Relation to Skin Diseases.—Because of their abundant vessel and nerve supply the mucous surfaces are prone to first reflect the action of the poison of the acute exanthemata or of other toxic agents in the general blood stream which act on the neuro-vascular apparatus or the vessels' walls. Furthermore, on account of anatomical and physiological differences the clinical course and symptomatology of mucous membrane affections may differ in a marked degree from similar skin eruptions. Organs may be disturbed which are closely related to the life of the individual; general toxaemia may result through absorption from infective foci or from broken down infiltrations. In short, it may be asserted that the succulence of mucous membranes, with their rich blood and lymph supply, render them susceptible to a large number of infective agents, with greater liability to constitutional disturbance than when the skin is in like manner the seat of the trouble. This is notably true of tuberculosis, which in its usual form on the skin seldom gives rise to a general infection, but is readily disseminated from mucous membrane or visceral foci.

As regards the diagnosis of mucous membrane lesions in general the usual rules which apply to purely cutaneous ones often fail us. There is less color contrast on account of the more translucent nature of the epidermic covering; vesicles, bullae and postules do not long exist as such; papular lesions are less sharply defined and more easily eroded; infiltrations readily ulcerate and become infected, and squamous types undergo modifications by reason of the moisture of the epithelial cells.

The marked difference in the appearance of the various eruptions on the skin, which often enables us to make a diagnosis at a glance, are not so defined on mucous surfaces. We may have to confirm our belief in the existence of a certain disease of these structures by the coincidence of the skin eruption or by a process of exclusion.

The implication of the mucous membranes in the acute exanthemata is almost invariable, and the rash occuring here, as it sometimes does in measles and scarletina before it appears on the skin, may materially aid us in making an early diagnosis.

The significance of the primary macules on the buccal and labial mucous membrane has been prominently emphasized.

The chronic infective granulomata are also, at some time in their course, found on the visible mucous membranes.

Syphilis, tuberculosis, glanders, actinomycosis and other members of this group of infections may involve the mucous membrane primarily, as a result of a general infection, or by direct extension from the skin lesions.

Certain general intoxications of the most diverse origin, comprising exudative erythema, urticaria, purpura and drug rashes may occasionally be seen in the mouth or give rise to gastro-intestinal or visceral complications of a serious nature.

The mucous membrane may be accidentally infected in the course of some of the pyogenetic affections by direct extension from the skin, through the medium of an infected finger, or in other ways.

It has been asserted that the skin and mucous membranes may be alternately invaded by catarrhal processes; that the rapid disappearance of an eczema has been followed by a bronchitis or asthma which in turn subsides and permits of a recrudescence of the eczema.

There are certain clinical grounds for the foregoing assumption in that the activity of a pathological process in one organ is often followed by a quiescent state of a similar process in another part of the body.

The papules and bullous lesions of the erythema group of skin disease when they appear on the mucous surface of the tongue or mouth, can readily be mistaken for the mucous patches of syphilis. Mercurial stomatitis may produce erosions which are with difficulty distinguished from the lesions the drug is intended to cure, and eventually can lead to such discoloration and thickening of the epithelium that the condition is easily mistaken for the scars of syphilis or leucokeratosis.

Antipyrine and other aniline derivatives have produced erosive lesions in the mouth, which have been taken for specific ones. The growth of cancer from surface keratoses or from the deeper lesions resulting from syphilis may be so slow that it is not always possible to differentiate the two conditions. Numerous instances have been observed where improvement in tongue and mouth neoplasms has taken place up to a certain point, and the hope was expressed that the entire condition might be syphilitic. It was difficult to convince the patient and at times the physician that a cancer had developed from the tissue alterations caused by syphilis.

On the other hand it was not so unusual for syphilitic lesions to be mistaken for malignant growths. This was true not only of the late circumscribed gummata but also of the initial lesion in extragenital and unusual locations.—(*Journal of Cutaneous Diseases,* September, 1904, J. A. FORDYCE.)